

CENTRAL NAUGATUCK VALLEY
REGIONAL PLANNING AGENCY

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ABSTRACT: This report analyzes current land use trends in the Central Naugatuck Valley Region and evaluates the need for future services and facilities based on expected land use development patterns in 1990. The report identifies the environmental impact of regional planning policies and programs and suggests possible means of improving regional land use planning through coordinated planning, improvements in governmental structures and mechanism for controlling the timing, intensity and pattern of growth. Finally, the report identifies specific programs to achieve the regional land use objectives set forth in the Revised Regional Plan of Development.

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1. AIRPORT DEVELOPMENT

The objective of this program is to assist the Connecticut Department of Transportation in the completion of an airport layout and master plan for Waterbury-Oxford Airport. This will ensure that long-term development of this facility will also promote the industrial growth in the surrounding Region.

2. INDUSTRIAL PARK DEVELOPMENT

The objective of this program is to assist municipalities in establishing new industrial zoning regulations which are consistent with the Region's air and water quality constraints and compatible with attracting fast growth, low polluting industry. Specific types of industry compatible with the economic opportunities and constraints in the CNVR will be recommended in conjunction with the work of the Greater Waterbury Chamber of Commerce and the Waterbury Economic Development Commission. The Central Naugatuck Valley Regional Planning Agency (CNVRPA) along with the Chamber of Commerce will assist in attracting fast growth firms to appropriate sites in the Region.

3. PRESERVATION OF AGRICULTURAL LAND

All active agricultural land will be identified and evaluated for long-term productive use. The program to preserve prime farmland will seek to recommend the most suitable local or state mechanisms to maintain agricultural activities and the most suitable means of financing the preservation program.

4. IMPROVEMENT IN STREAM WATER QUALITY

All water pollution sources of a direct or indirect nature will be identified and recommendations prepared to minimize future water contamination. The land use management recommendations developed under this program will be submitted to all affected municipalities for review and adoption by local zoning and/or inland wetland agencies.

5. LOCAL TECHNICAL ASSISTANCE

One of the objectives of this program is to expand the information and understanding of local land use decision makers by supplying them with greater planning assistance through the A-95 review process and state statutory referrals. Another objective is to develop and expand the map resources of each municipality and provide technical assistance to planning and zoning commissions in the interpretations and use of map resources.

6. DEVELOPMENT OF A CONSISTENT DATA BASE

The objective of this program is to ensure that the State, the Tri-State Regional Planning Commission, local municipalities and the CNVRPA accept and adopt consistent policies, standards and data base for short and long term planning. Numerical targets will be adopted and cross-accepted for the amount of industrial, commercial, agricultural and sand and gravel land needed by each municipality in 1990.

7. MONITORING OF TRENDS

The annual monitoring of trends report prepared by the CNVRPA will be expanded to offer information on current trends in per capita consumption of energy, data on residential, commercial and industrial land costs, and trends in commercial and industrial growth in the Region. This report provides valuable information on short term trends which is essential for planning expansions or curtailments in municipal services.

8. INVENTORYING LAND USES

The CNVRPA will develop a series of land resource maps for the 13 municipalities in the Region. The objective of the program is to improve the decision-making capabilities of planning and zoning commissions by supplying them with up-to-date cartographic information on existing land uses, earth resources and environmental constraints to development.

9. PRESERVATION OF HISTORIC STRUCTURES

The preservation of historic buildings and sites not only reinforces the concept of rehabilitation but furthers the goal of preserving the history and character of the Region. The primary emphasis of the preservation program is to insure full local participation in state surveys identifying structures of historic value. A greater level of state and federal financial support for preservation in the CNVR along with improved markers to identify existing historic structures are the two principal objectives for fiscal year 1979-1980.

10. DEVELOPMENT AND PROTECTION OF SAND AND GRAVEL RESOURCES

The objective of the program is to identify areas of earth resources and to amend zoning regulations so as to protect sand and gravel deposits from incompatible future development. The preparation of earth resource maps for each town will be a prelude to the adoption of earth resource zones.

11. GROWTH MANAGEMENT

The purpose of this program will be to improve the methods by which municipalities control the location, timing and intensity of residential growth. The emphasis will be on the adoption of zoning regulations which are consistent with the provision of lower cost housing and that can maintain the quality of the man-made and natural environment. Environmental constraints to development (including air, water, soil, traffic) will be reviewed and standards will be proposed to ensure that land use controls are consistent with state of the art literature on growth management.

A regional transit district is to be established as a means of developing a comprehensive system of transportation to serve the entire Region. It is anticipated that a transit district will be initially limited to the area currently provided with public bus service but could later be expanded to a larger jurisdiction when suburban densities increase to a level capable of supporting mass transit.

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REGIONAL LAND USE PLAN

1. INTRODUCTION

The Regional Land Use Plan is a summary in land use terms of all the goals, objectives, regional policies and programs delineated in the 18 other elements that make up the Plan of Development. The Regional Plan of Development was adopted on July 21, 1975. The Plan includes a land use element which was prepared in conjunction with the other elements after reviewing local, State and Tri-State land use plans. The Plan's functional elements are: housing and population, economic development, land use, transportation, communications, recreation and open space, waste water, water supply, flood control and prevention, solid waste, air quality, health, education, social services, equal opportunity, civil preparedness, fire prevention and suppression, criminal justice, and energy.

The 1975 Plan replaced the 1964 General Plan of Regional Development. A new Plan, rather than just a revision of the old, was prepared for several reasons. An inventory in 1970 of the Region's existing land use produced much more complete and detailed information on the current situation than had been available previously; the input of specific policies from the comprehensive range of elements generated fresh thinking on numerous issues, many of which have been concerns since the early 1960's. A land suitability analysis undertaken with new soils and sewer information permitted more precise judgements on the physical potential of each area. While many revisions have been made in the Region's land plan, it differs little in its concepts from the 1964 edition despite significant changes that have occurred both within and without the Region in the last 14 years. This is because the Region's basic character and form have been primarily determined by its historic development along the Naugatuck River Valley and the limitations of growth posed by hilly terrain. The result of this land use planning process has, therefore, been an evolution of many of the concepts in the earlier Plan, redirection of a few and refinement in detail everywhere.

Since 1975, the Agency has reviewed and refined its land use plan and prepared several technical studies on such land use issues as industry, agriculture, taxation, surface mining, retail sales, historic preservation and housing and employment trends. These land use related studies are described briefly below.

a. Status of Land Use Elements

The Agency's 1976 study, Farms, Farmers and Farmlands: The Role of Agriculture in the CNVR delineates trends in agricultural activity and agricultural land in the Region; Revenues and Ratables: Financing Government in the CNVR (1976) analyzes tax issues and needed reforms; Historic Landmarks and Programs for Preservation (1976) provides local governments with current State and federal preservation programs and the location of existing landmarks; A Survey of Retail Sales in the CNVR (1976) presents consumer shopping patterns in the Region and the State; Surface Mining in Connecticut: The Public Need for Planning and Regulation for Sand and Gravel Operations (1976) surveys current planning and regulatory practices of sand and gravel operations in the State and suggests possible improvements in these practices; and the Profile of the CNVR 1970-1975 (1977) provides data on current population, housing and employment trends.

Other land use related activities undertaken by the Agency include the preparation of two studies for the Greater Waterbury Chamber of Commerce to identify the locational advantages of the Greater Waterbury Area for surgical and medical and electronic components industries. Further, the consulting firm of Gilbert Associates recently prepared a Solid Waste Management Plan to identify a regional solution to the disposal of solid waste in the Central Naugatuck Valley Region. These land use related publications have provided detailed information on land use developments in the Region and facilitated the preparation of the Agency's Land Use Element as required by the Housing and Community Development Act of 1974. Consequently, this land use element expands the land use element adopted in 1975 as part of the Regional Plan of Development since it sets forth a comprehensive treatment of all the land use related goals and impacts of the 18 functional elements. However, the objectives set forth in the 1975 land use plan have been maintained in this land use plan.

2. EXISTING LAND USE

Updated information on how land in the Region is currently used was provided by the Land Use Update Study conducted jointly by the former Connecticut Office of State Planning, (Office of Policy and Management) the Department of Transportation and the CNVRPA. Using an aerial survey flown in March 1970, the Region's land was classified by photo interpretation and field knowledge into nine general area categories following the Standard Land Use classification system for Connecticut (SLUCONN). The data is available by town and a summary of the results is presented for the Region in Table 2-1.

In general, the most suitable land is used for development first. Only general comparisons can be made with previous existing land use inventories (such as the CNVRPA 1962 report, How Our Land is Used) because the land use categories are not consistent. However, the overall trends in the Region are clear. The greatest change has been in land used for residential purposes. Approximately 6,000 additional acres were occupied between 1960 and 1970.¹ Of the 10,000 new dwelling units, 7,900 are in the suburban towns, indicating that the outlying areas are experiencing the greatest impact from recent residential growth.

Table 2-2 analyzes the functions of the various municipalities as measured by the Land for trades and services more than doubled in the 1960-1970 decade,² with much of this growth occurring in Waterbury itself. New commercial development is probably most noticeable in the suburban towns, however, where car-oriented shopping centers are augmenting the old "main street."³ In Southbury, for example, there was 1 acre of business use per 320 persons in 1960, but 1 acre per 25 persons in 1970. Similar dramatic changes have occurred in Cheshire, Thomaston and Beacon Falls, the latter two probably reflecting the growth of roadside commercial strips. Overall, in 1970, the Region had 1 acre of retail and services land for every 80 persons compared with 1 for every 160 in 1960.

¹Land Use, CNVRPA, 1975, p.2

²Ibid.

³This suburban commercial development is reflected in larger retail sales in 1974 than 1967. See A Survey of Retail Sales in the CNVR, 1976.

Manufacturing expansion has followed a different pattern, with some suburban growth, but Waterbury continues to retain the lion's share of both the growth and the total land in this area. Of the remaining 12 towns, only Middlebury⁴ and Wolcott have increased their acreage significantly. With the growth of the service sector and population, industrial land per capita is now only half what it was in 1960. Table 2-1 shows that urban land uses⁵ take up less than one-fifth of the total land area of the Region (although these uses are very apparent visually to persons traveling in the CNVR). Of the remainder, 14% is devoted to resource extraction and production (primarily active agricultural uses) while two-thirds is open or under-developed. In general, the most suitable land is used for development first, so that much which remains has difficult terrain or is reserved for open space. Just how much is suitable for development is outlined in the land suitability analysis (Appendix A), but it is certain that the rate of land consumption experienced between 1960-1970 (equivalent to a rate of 7,500 acres or more per decade or approximately a 25 percent increase in built-up land over the 1960-1970 period) cannot continue indefinitely.

Table 2-2 analyzes the functions of the various municipalities as measured by the acreage assigned to built-up land uses. The continued core function of Waterbury is expressed in its strong share of all categories, particularly commerce, manufacturing and entertainment. The suburban share of non-residential land uses is located in Cheshire, Naugatuck, Southbury, Wolcott, Woodbury, Thomaston, Middlebury, Beacon Falls and Watertown. Apart from agriculture, the remaining towns (Bethlehem, Oxford and Prospect) provide very little employment and hence may be considered primarily "bedroom communities" for residents who work and shop elsewhere.

⁴For inventory purposes, the land actively used by the Uniroyal Complex is counted in the manufacturing category.

⁵In classifying land uses as urban, the following categories in Table 2-1 were included: residential; manufacturing and transportation; communications and utilities; trades and services; cultural and entertainment and recreation.

Table 2-1: Existing Land Use in the CNVR, 1970

Municipality	Land Use Category								
	Residential	Manufacturing	Transportation, Communication and Utilities	Trades and Services	Entertainment, Recreation	Resource Production and Extraction	Under-developed, Unused, Reserved Lands and Water Areas	Unidentified Land Use	Municipal Land Area
Beacon Falls									
Ac	1,298	87	80	126	12	239	4,473	-	6,315
%	20.5	1.4	1.3	2.0	0.2	3.8	70.8	-	100.0
Bethlehem									
Ac	529	0.1	0.1	31	30	4,757	7,220	-	12,567
%	4.2	-	-	0.2	0.2	37.9	57.5	-	100.0
Cheshire									
Ac	3,908	129	200	379	136	3,541	12,616	279	21,188
%	18.5	0.6	0.9	1.8	0.6	16.7	59.6	1.3	100.0
Middlebury									
Ac	1,205	129	250	92	78	1,367	8,617	28	11,766
%	10.2	1.1	2.1	0.8	0.7	11.6	73.3	0.2	100.0
Naugatuck									
Ac	2,095	186	160	142	55	640	7,202	45	10,525
%	19.9	1.8	1.5	1.4	0.5	6.1	68.4	0.4	100.0
Oxford									
Ac	1,369	15	173	32	75	2,524	17,073	101	21,362
%	6.4	0.1	0.8	0.2	0.3	11.8	79.9	0.5	100.0
Prospect									
Ac	1,327	4	-	50	180	576	7,014	97	9,248
%	14.4	0.0	-	0.5	1.9	6.2	75.9	1.1	100.0
Southbury									
Ac	1,811	28	373	309	441	4,292	18,277	44	25,575
%	7.1	0.1	1.5	1.2	1.7	16.8	71.4	0.2	100.0

Table 2-1: Existing Land Use in the CNVR, 1970 (continued)

Municipality	Land Use Category								
	Residential	Manufacturing	Transportation, Communication and Utilities	Trades and Services	Cultural, Entertainment, Recreation	Resource Production and Extraction	Under-developed, Unused Reserved Lands and Water Areas	Unidentified Land Use	Municipal Land Area
Thomaston									
Ac	785	72	214	185	0	482	6,019	0	7,757
%	10.1	0.9	2.8	2.4	0.0	6.2	77.6	0.0	100.0
Waterbury									
Ac	5,716	914	523	1,049	609	159	9,477	108	18,555
%	30.8	4.9	2.8	5.6	3.3	0.9	51.1	0.6	100.0
Watertown									
Ac	1,918	49	231	83	303	4,474	11,834	4	18,896
%	10.2	0.3	1.2	0.4	1.6	23.7	62.6	0.0	100.0
Wolcott									
Ac	2,264	117	0	168	104	475	10,397	0	13,528
%	16.7	0.9	0.0	1.2	0.8	3.5	76.9	0.0	100.0
Woodbury									
Ac	1,612	16	38	97	47	5,406	16,204	-	23,420
%	6.9	0.1	0.1	0.4	0.2	23.1	69.2	-	100.0
CNV Region									
Ac	25,837	1,746	2,245	2,743	2,070	28,932	136,419	706	200,702
%	12.9	0.9	1.1	1.4	1.0	14.4	68.0	0.3	100.0
12 Towns									
Ac	20,121	832	1,722	1,694	1,461	28,773	126,942	598	182,147
%	11.1	0.5	0.9	0.9	0.8	15.8	69.7	0.3	100.0

Source: 1970 Connecticut Land Use Update Study.

(continued) Table 2-2: Built-Up Land in the CNVR, 1970

Municipality	Land Use Categories					Total Built-Up Land	Percent of Town Land Area Built-Up
	Residential	Manufacturing	Trades and Services	Cultural, Entertainment and Recreation			
Beacon Falls	Ac %	1,298 5.0	87 5.0	126 4.6	12 3.9	1,523	24.1
Bethlehem	Ac %	529 2.0	0 0	31 1.1	0 0	560	4.5
Cheshire	Ac %	3,908 15.1	129 7.4	279 13.8	43 13.9	4,459	21.0
Middlebury	Ac %	1,205 4.7	129 7.4	92 3.4	22 7.1	1,448	12.3
Naugatuck	Ac %	2,095 8.1	186 10.7	142 5.2	0	2,423	23.0
Oxford	Ac %	1,369 5.3	15 0.8	32 1.2	0	1,416	6.6
Prospect	Ac %	1,327 5.1	4 0.2	50 1.8	0	1,381	14.9
Southbury	Ac %	1,811 7.0	28 1.6	309 11.3	0	2,148	8.4
Thomaston	Ac %	785 3.0	72 4.1	185 6.7	0	1,042	13.4
Waterbury	Ac %	5,716 22.1	914 52.3	1,049 38.2	135 43.5	7,814	42.1
Watertown	Ac %	1,918 7.4	49 2.8	83 3.0	68 21.9	2,118	11.2
Wolcott	Ac %	2,264 8.8	117 6.7	168 6.1	30 9.7	2,579	19.1
Woodbury	Ac %	1,612 6.2	16 0.9	97 3.5	0	1,725	7.4

Table 2-2: Built-Up Land in the CNVR, 1970 (continued)

Municipality	Land Use Categories					Total Built-Up Land	Percent of Town Land Area Built-Up
	Residential	Manufacturing	Trades and Services	Cultural, Entertainment and Recreation			
CNVR	Ac %	25,837 100.0	1,746 100.0	2,743 100.0	310 100.0	30,636	15.3
Source: 1970 Connecticut Land Use Update Study.							
Note: The built-up land area was tabulated by calculating the acreage of specific sub-land use categories from the 1970 Land Use Update Study Town Summary for each municipality. The following subcategories are defined as built-up land.							
Residential - H1, H2, H3, H4, HE, M1, M2, M3, M4.							
Manufacturing - IL, IH.							
Trades and Services - ST, SM, SH, SC, SS, SP, SE, SR.							
Cultural, Entertainment and Recreation - CP, CT, CS, CF.							
State Park and Forest Land and Water Company Land are not included.							
Oxford	Ac %	0	35 1.2	12 0.8	1,369 2.3		
Prospect	Ac %	0	20 1.8	11 0.2	1,327 2.1		
Southbury	Ac %	0	309 11.3	28 1.6	1,811 7.0		
Thomaston	Ac %	0	182 6.7	72 4.1	792 3.0		
Waterbury	Ac %	132 43.2	1,049 38.2	214 25.3	2,716 22.1		
Watertown	Ac %	2,118 21.2	88 21.9	83 3.0	1,918 7.4		
Wolcott	Ac %	2,229 2.7	168 6.1	177 6.7	2,574 8.8		
Woodbury	Ac %	0	97 3.2	16 0.9	1,672 6.2		

By 1990, further changes in the relative functions of the towns can be expected if 1960 to 1970 trends continue. From 1960 to 1970, 90 percent of the new residential acreage in the Region was developed in the suburbs and 80 percent of the new commercial acreage, but only 40 percent of the new industrial acreage was developed in the suburbs. Thus Waterbury, as the core of the Region, may still attract a significant share of all new non-residential development. However, in recent years,

the availability of lower cost land in the suburbs has undoubtedly increased the attractiveness of locating outside of Waterbury. The recent out-migration of business, industry and the population to the Region's suburban municipalities indicates that the Region may face substantial sprawl development unless current trends are modified. The departure of industries from the central city to the suburbs has increased the costs of maintaining city services and facilities without any increase in the tax base. Industries and businesses have hesitated to locate in the City of Waterbury when accessibility by Interstate 84 has improved the site

advantages of suburban locations and low cost suburban land and low taxes have compensated for the services available in the City. (The departure of the City's tax ratables is clearly a major factor influencing the Region's land development patterns.)

commuting to work by car has increased from 73 percent in 1960 to 83 percent in 1970. In addition, 15 percent of the Region's households had no cars in 1970 and depended to varying degrees on a mass transportation system weakened by the trend towards the automobile. Frequent, regular bus service is available only in Waterbury. Changed land use patterns are, therefore, essential in order to facilitate mass transportation so as to replace some of the routine automobile trips.

b. Access to Employment

Between 1960 and 1974, 73 percent of the jobs created in the Region were sited in the outlying towns.⁸ While this is also the trend for population growth (97 percent

⁸ Connecticut State Department of Health, Weekly Health Bulletin, Vol. 26, No. 40, (October 31, 1975).
⁹ The 1960 Waterbury SMA included the municipalities of Beacon Falls, Cheshire, Middlebury, New Britain, Prospect, Thomaston, Waterbury, Waterford, and Wolcott.
¹⁰ Manpower Report for the Waterbury Labor Market Area, 1975, CWRBA, September 1975.

3. CURRENT LAND USE TRENDS

While the Region's development has been compatible with the underlying assumptions of the Regional Plan, a number of current trends give cause for concern. These trends, the major ones of which are summarized below, are the reason why the Regional Land Use Plan cannot simply promote a continuation of existing trends. Some modification of the system is required.

a. Increasing Dependence on the Automobile

The increased use of the automobile has not only given drivers greater mobility and flexibility in meeting their transportation needs, but has also encouraged land use patterns which force a great dependence on the automobile. Suburban families find they need two or more cars in order to travel to work, transport children to their activities, do shopping, go to doctors, visit friends, etc. Total miles traveled per capita is rising, with serious consequences for energy and time consumption, air pollution and highway overcrowding.

An increasing proportion (52.9 percent in 1975)⁶ of the Region's population now lives outside the central city and 52 percent of these families owned two or more cars in 1970. In the Waterbury SMSA (1960 definition),⁷ the proportion of workers commuting to work by car has increased from 73 percent in 1960 to 83 percent in 1970. In addition, 15 percent of the Region's households had no cars in 1970 and depended to varying degrees on a mass transportation system weakened by the trend towards the automobile. Frequent, regular bus service is available only in Waterbury. Changed land use patterns are, therefore, essential in order to facilitate mass transportation so as to replace some of the routine automobile trips.

b. Access to Employment

Between 1960 and 1974, 73 percent of the jobs created in the Region were sited in the outlying towns.⁸ While this is also the trend for population growth (97 percent

⁶Connecticut State Department of Health, Weekly Health Bulletin, Vol. 56, No. 40, (October 31, 1975).

⁷The 1960 Waterbury SMSA included the municipalities of Beacon Falls, Cheshire, Middlebury, Naugatuck, Prospect, Thomaston, Waterbury, Watertown, and Wolcott.

⁸Manpower Report for the Waterbury Labor Market Area, 1975, CNVRPA, September 1975.

of the Region's growth for the same period was in these towns), most jobs are located in the City of Waterbury. The net result of this dispersal is that the distance traveled to urban work sites is increasing at the same time that travel by automobile to the job is becoming more essential. Where substantial employment is available within a suburban community, it is largely taken by non-residents, while residents of that community commute elsewhere. In 1970, slightly over two out of every three persons working in a suburban municipality did not reside in the town where he or she worked. For example, in Middlebury, which had the second highest ratio in the Region of local jobs per resident in 1970, only 22.8 percent of the residents who worked actually worked in Middlebury. In order to increase access to employment, industry must be sited near the population centers of the Region.

c. Increasing Cost of Housing

A large proportion of the Region's families cannot afford to buy a new single-family house at today's prices. Although incomes are rising, housing costs are rising at an even greater rate. One indication of this is that, nationally, the median priced new house increased 68 percent between 1970 and 1975 while national family income increased only 39 percent. Land availability and land use patterns are two factors contributing to this rise and methods need to be found to bring the cost of shelter within reach of those who need it. Of all the units built in the Region between 1960 and 1970, 44 percent were multi-family. This high proportion of multi-family units constructed will probably continue to be the norm as the cost of other forms of housing continues to increase and as changes occur in the size of the American household.

d. Increased Energy Consumption

Another factor which has influenced the pattern of land uses in the Region has been the previously low cost of energy for travel and home heating. Prior to the energy crisis of 1974, the cost of energy provided little if any disincentive to development in suburban or rural areas. Gasoline, fuel oil and electricity were relatively

inexpensive and residents could afford to live without regard to distance from their place of work, shopping or recreational centers. The City of Waterbury is located in the

distance traveled to urban work sites is increasing at the same time that travel. Even with rapid increases in petroleum products, residents have continued to live by automobile to the job is becoming more essential. Where substantial employment in the suburbs although many have taken conservation measures (such as buying smaller cars and insulating their homes) to lessen the financial pressures of higher cost energy. However, if energy costs continue to increase, current sprawl out of every three persons working in a suburban municipality did not reside in the development patterns are less likely to continue.

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4. REGIONAL FORM

Regional form is a concise way of describing how the specific policies arising from other elements of the regional planning process can be applied to the overall land use patterns. Thus, the concepts of regional form along with the existing land use and suitability analysis are used to draw up the land use densities and distributions which appear on the land use map.

a. Historical Basis

The Central Naugatuck Valley Region had its genesis in the manufacturing centers which located on the flat land that was available close to the north-south flowing Naugatuck River. These centers, of which Waterbury was the largest, continued to attract residents and employment so that, until automobile ownership became commonplace, almost all regional activity was concentrated in these densely built-up centers. Gradually large lot housing has been constructed in the agricultural areas of the Region, but due to well-defined ridges and valleys in the suburban towns, the Region has tended to grow without losing its open, green character.

Because of the Region's hilly terrain and steep slopes, much of the land has and will continue to remain open and undevelopable. However, the suburbanization of industry and the population has somewhat altered the pattern of clustered development and promoted the growth of secondary commercial and residential centers in the Region. The concept of regional form discussed below reflects the Region's historical growth pattern modified where possible and necessary to anticipate the needs of present and future residents. For this reason, the concept is not merely an expression of existing land use patterns but a tool that can be used to shape current and planned development to enhance the environmental, social and economic well-being of the Region.

b. Policies Underlying the Regional Form

The analyses of needs, problems, goals and objectives in each of the other 18 elements of the Regional Plan have produced specific policies which are needed to

improve the quality of life in the Region. These policies, many of which affect land use patterns, reflect and reinforce the need for clustered development so as to take full benefit of the economies of scale associated with higher density development.

The 18 functional areas of the plan have been formulated in terms of their impact on regional land uses. Transit supporting densities, for example, depend on clustering to allow for the provision of public bus service. Clustering of economic development in the urban core of the Region and secondary centers allows for more efficient utilization of existing services and maximizes access for the labor force. The development of residential and economic activities in clusters allows for economies of scale in the provision of sewer services. Protection of watershed and flood plain areas limits the scattered development over areas which should remain natural or recreational areas. Finally, clustered development is supported by energy policies which specify that housing in close proximity to industry could allow for more efficient utilization of waste heat. Multi-family housing in higher density areas is more energy efficient due to common walls and the economies of scale associated with the urban heat island⁹ effect.

c. The Concept of Regional Form

These policies form the basis for the overall land use concepts of the plan. The concept of regional form reflects the historical pattern of development in the Region, modified and supported by the land use related policies of the Plan. The broad concept of regional form has, therefore, been an instrument in the development of the land use plan.

d. Strong Core

The concentration of population along the Naugatuck River between Waterbury, Naugatuck and Watertown is the primary (employment, commercial, governmental and

⁹The urban heat island refers to the fact that urban areas tend to have warmer temperatures in the winter due to a variety of urban activities which generate heat and alter the local climate and temperature.

cultural) focus of the Region, although there are also secondary centers* on the Naugatuck River (Thomaston and Beacon Falls), on the Pomperaug River in Southbury, and the Ten Mile River in Cheshire. Adoption of a strong core concept implies continued encouragement of economic, governmental and residential activities to be located in the Waterbury-Naugatuck core, along with support for a subsidiary level of activities in the secondary centers in the outlying portions of the Region.

e. Residential Densities Radiating from the Strong Core

The highest residential densities are presently found in the Waterbury-Naugatuck core. However, continued replacement and upgrading of the housing stock will be necessary to insure sufficient housing near the Region's employment center. The present density range in the center should be maintained to facilitate the ease of access to jobs, services and mass transportation and to provide for one of many possible life styles. Medium density urban housing should be maintained as at present in the sewered areas at a greater distance from the core. Low density urban housing should be favored in the areas serviced with sewers and water which are on the periphery of the core.

A similar gradation in density will occur around the secondary centers elsewhere in the Region which are served with sewers and water. However, the use of land for high urban density should be discouraged outside the core area.

It is anticipated that the majority of new housing in the Region should thus be at medium or low density if the strong core policy is followed. This will encourage development to focus around the established core and secondary centers and limit "leapfrog" development patterns.

f. Open Space Character

Open space will continue to be a key theme in regional form. In addition to existing and proposed reservations, the third of the Region which is steep slopes, significant

*These secondary centers were identified by virtue of having at least two of the following factors: employment concentration, commercial center, cultural center or civic center.

wetlands, flood plains or poor soil will be maintained as far as possible in its natural state.

g. Limited Development Areas

The remaining area of the Region which is remote from the core or secondary centers and hence unsewered, will be retained in its predominately rural character, with only sparse housing and few, if any, new roads. In the scattered pockets of good soil within these limited development areas, housing may be developed at a higher density if the cluster principle is followed and the overall gross density is kept low.

h. Some Suburban Commercial and Industrial Development

Not all desirable new commercial and industrial development can be fitted into the Waterbury-Naugatuck core. To ensure that access to these new jobs and services is maximized, location in the secondary centers is the next choice. New industrial sites should be located on the primary transportation routes so that the accessibility and employment opportunities created within the Region promote the orderly development of secondary centers. These centers can facilitate development of nearby residential and commercial land uses at urban residential densities. The 1975 Regional Plan of Development identifies secondary industrial centers in the municipalities of Cheshire, Watertown, Wolcott, Naugatuck, Oxford and Middlebury.

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5. THE DEMAND FOR LAND IN 1990

Current land use trends in the Region indicate that substantial development will occur over the CNVRPA's short term planning period ending in 1990. The primary demand for land will be for residential purposes with much of this growth occurring in currently unused woodlots and, more often than not, on what is now prime agricultural land that has gone out of active use. As can be seen in Table 2-3, the 15,656 acres of farmland that are expected to be lost by 1990 will provide the bulk of the land for additional residential, manufacturing and commercial uses. However, some of the expected loss of farmland will simply become unused or underdeveloped land maintained by retired farmers. The conversion of farmland to inactive use is expected to be the second largest change in farmland use following its use for residential development. Recent emphasis on economic development of the Region, along with the Waterbury Labor Market Area's low wage rate (compared to the State) should also stimulate manufacturing growth and a demand for nearly 800 additional acres of land for industrial use (see Appendix E for the detailed steps in calculating industrial land needs for 1990). No major changes are foreseen in the amount of land needed for cultural or entertainment purposes.

a. Residential

Over the next fifteen years, the Region should continue to experience a strong demand for the construction of new housing. Between 1960 and 1970, the demand for housing resulted in the conversion of over 6,000 acres of land to residential development. The demand for new housing in the Region will continue; but, due to recent trends in the construction of multi-family housing, future residential developments will be more space efficient - providing more dwelling units per net acre. Based on population projections for 1990, the Region will require a projected 26,000¹⁰ new dwelling units, of which 10,400 are expected to be multi-family housing and 15,600 for single-family houses. These new housing units will require an additional

¹⁰Based on past housing trends in the Region and the Nation, multi-family housing is expected to grow in popularity with 40% of all new dwelling units falling in this category during the period 1970-1990.

Table 2-3: Expected Demand for Land in the CNVR: 1970-1990

	Existing Land Uses - 1970 Acres	Expected Land Uses - 1990 Acres	Expected Changes in the Demand for Land in Acres
Residential	25,837	42,289	+ 16,452
Manufacturing	1,746	2,532	+ 786
Transportation and Utilities	2,245	2,435	+ 190
Trades and Services	2,743	3,371	+ 628
Cultural	2,070	2,070	0
Agriculture	26,314	10,658	- 15,656
Mineral Extraction	1,320	646	- 674
Other Production Land	1,298	600	- 698
Underdeveloped, Unused Reserved Lands*	137,129	136,103	1,026
Total Land Area	200,702 Acres	200,702 Acres	

*Includes unidentified land uses.

Source: CNVRPA Staff Work, August 1976 and Appendices E, F and G.

Over the next fifteen years, the Region should continue to experience a strong demand for the construction of new housing. Between 1960 and 1970, the demand for housing resulted in the conversion of over 6,000 acres of land to residential development. The demand for new housing in the Region will continue; but, due to recent trends in the construction of multi-family housing, future residential developments will be more space efficient - providing more dwelling units per net acre. Based on population projections for 1990, the Region will require a projected 26,000 new dwelling units, of which 10,400 are expected to be multi-family housing and 15,600 for single-family houses. These new housing units will require an additional

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16,452 acres of land by the year 1990. (See Appendix H.) This rate of development is higher than that experienced in the decade of the sixties, however, it is expected that higher housing and land costs will encourage clustered residential developments and the development of multi-story apartment buildings which are more efficient users of land.

b. Commercial

In turn, the growth of housing in the CNVR has accelerated commercial development in many of the municipalities. Where formerly many of the Region's residents turned to Waterbury or other metropolitan areas to do their shopping, today, residents of the Region are finding more of their needs met within a closer distance of home. Land devoted to trades and services more than doubled in the decade of the sixties with one acre of retail and service land available for every 160 persons in 1960 and one acre for every 80 persons by 1970.

Based on the CNVRPA's population projections for 1990, 638 additional acres of land will be needed for trades and services in order to provide the equivalent level of shopping and retail services as existed in 1970. However, the demand for nearby shopping facilities and commercial development is not simply a function of the population growth of the Region. There are threshold populations necessary to support each retail service based on the demand for the service. As an example, while gas stations are the least dependent on local population levels, a specialty store or a cultural center may require nearby populations of over 100,000 to support themselves. The population thresholds required to support retail and commercial services varies with the establishment and the shopping habits of nearby consumers. In 1990, the Region's population growth should be sufficient to support many trades and services that presently are only available in other nearby metropolitan areas. This trend toward increased self-sufficiency in the provision of trades and services within the Region should also be reinforced by the rising costs of travel. Higher gasoline prices will stimulate local business which, in turn, will promote the development of additional commercial developments. However, despite rapid

commercial growth in the Region, trades and services are expected to account for only 1.68% of all the Region's land in 1990.

c. Industrial

Historically, the CNVR has been an important manufacturing area in Connecticut. Approximately 64% of the labor force was involved in manufacturing work in 1950 and by 1975, when 23% of the Nation's labor force was in manufacturing, the Waterbury Labor Market Area (WLMA) maintained 41.4% of its labor force in this sector of the economy. Despite declines in the percentage of workers engaged in manufacturing employment in the Region, manufacturing will continue to be a more significant element of the Region's economy than it is of the State or the Nation. Nonetheless, the historical trends toward the services sector of the economy, along with the attraction of cheaper labor pools in the South and proximity to raw materials in the Midwest and Southeast, has encouraged and will continue to encourage large industry to leave the Region. It is expected that the Region will experience a decline in manufacturing employment to a level proportionate to the current percentage of State employment in the manufacturing section (34%)

In effect, most of the growth of the labor force will occur in the non-manufacturing sector with greater demands for office space than for industrial land. In 1970, 1,746 acres or 0.9% of the Region's land mass was devoted to manufacturing uses. However, because of recent trends toward suburban industrial parks and the relocation of some Waterbury firms in the suburbs, industry will require more acres per employee than in previous years. The single floor suburban factory has gradually replaced the multi-story urban firm with a concomitant increase in the land required by industry. This trend should increase projected industrial land use needs from 1 acre for every 45 employees in 1970 to one acre for every 15 employees in 1990.

(See Appendix E.)

d. Transportation and Utilities

Land devoted to transportation and public utilities is not expected to increase appreciably by 1990. Currently, the Region is served with an excellent system of limited access roads, arterials and collectors and few major construction programs are planned or underway. Construction of Route I-691 in Cheshire and the relocation of Route 8 through Beacon Falls and Naugatuck are the only major roads which will require the acquisition of additional land. However, the major demand for land used for automobiles will be in subdivisions in the suburban municipalities. The acreage required for residential rights-of-way in the Region is included within the gross acreage to be consumed by residential developments (see Appendix H).

The Northeast Utilities System anticipates construction of three and possibly four new electric transmission lines within the Region by 1990. (See Appendix F.) The most urgent need for additional power lines has occurred in Southbury where rapid residential development in Heritage Village (an all-electric community) has quadrupled peak energy demands in less than 10 years. The Director of Planning of Northeast Utilities has indicated that by 1983, a new 115 kv transmission line will be constructed between Frost Bridge Substation in Watertown and Prospect Junction in Thomaston.

In the more distant future, Northeast Utilities has an alternative option on the development of its 345 kv transmission line grid system in southwestern Connecticut that would entail replacement of four 115 kv lines with one 345 kv line between Waterbury and Milford. As a result of these three transmission lines, the Region may experience the conversion of, at most, 130 acres of unused land for public utility right-of-way by the year 1990. (See Appendix F.)

Consequently, by 1990, no more than 190 acres of land will be necessary to meet the needs of both transportation facilities and electric utilities in the Region. There are no anticipated demands for additional land for gas transmission lines and the four cable television franchises serving the Region are expected to be able to

support their transmission lines on existing public utility poles. Consequently, land required for transportation, communication and utilities will increase only 8.4% in the next fifteen years with an estimated 2,435 acres devoted to these land uses by 1990.

e. Agricultural Land

While the Region's built-up land has been steadily increasing, its active agricultural land has been rapidly declining in importance. In 1970, 13.1% of all the Region's land was in active agricultural use. The bulk of this land was in Bethlehem, Watertown, Southbury, Woodbury, Cheshire and Oxford which have also been the municipalities experiencing the most rapid growth in population and new residential developments. By 1975, only 10.9% of the Region's land was listed as farmland exempted under Public Act 490. If farmland in the Region continues to decline at the current rate experienced in the early seventies, the Region will be without any active agricultural land near the year 2000. However, trends in the percentage of land in farms for New Haven County are even less optimistic. Based on trends from 1940 to 1970, farmland in New Haven County (including 9 of the Region's 13 municipalities) may disappear entirely near the end of the decade of the eighties unless the State and its municipalities act soon to protect it. A report prepared by the CNVRPA titled, Farms, Farmers and Farmlands: The Role of Agriculture in the CNVR (1976), endorses the preservation of agriculture in the Region to assure the availability of low-cost fresh produce within the State. Unless the State legislature takes some action, such as an act designed to purchase the development rights of farmers, or provides economic assistance to farmers in the State, nearly all major agricultural activities in the Region may disappear by 1990. However, not all of the agriculture in the Region is immediately affected by urban growth pressures. A minimal level of dairy, poultry and nursery farming will remain in the Region since not all of the Region's municipalities face the pressure of major industrial or residential development over the next fifteen years. Nonetheless, in many cases, farmland may go out of active agricultural use, even

without the pressure of the sale of this land for residential or industrial land uses. Many farmers are leaving farming not simply because of the high price offered for their land by real estate speculators, but because farming has become a marginally profitable economic activity. By 1990, the Central Naugatuck Valley Region is expected to lose an additional 15,656 acres from active agricultural use with only 5.3% of the Region's land devoted to agriculture. This lost agricultural land will primarily be converted to residential developments although some will simply lie idle.

f. Mineral Extraction

Land used for the extraction of sand and gravel are also expected to decline over the next fifteen years.

According to the Connecticut Highway Department, acreage devoted to the extraction of sand and gravel has been declining at the rate of 5.4% per year. Based on estimates prepared by the Connecticut Highway Department, by 1990, the Region is expected to lose about 674 acres of land from use for mineral extraction. Some of these lands will be converted to residential and recreational uses since sand and gravel sites provide suitable soils for septic system leaching and are generally compatible with recreational uses when landscaped properly.

g. Recreation Services

The Central Naugatuck Valley Regional Planning Agency has identified 11,000 acres of land available for open space and recreation in 1975. This regional recreation land consists of all land owned by the State, federal and municipal governments and by private non-profit organizations. By 1990, assuming that 53 acres of open space and recreation land are needed for every 1,000 residents, the Region is

6. SERVICES REQUIRED TO MEET THE PROJECTED NEEDS

Increases in population and residential development will require improvement and expansion of many of the municipal, State and private sector services available in the Region. Increases in population will require expanded recreation facilities, improved transportation systems, fire and police services, additional solid waste services and an extension of major public utilities. The cost and quantity of services required to serve the Region's population in 1990 will depend in large part on the geographic distribution of future population growth. If growth is focused in the urbanized portion of the Region, service such as sewers, police and fire protection and public transportation may be offered at minimal costs because these services are already well-developed and have additional capacity to accommodate future population growth. However, if population growth should occur in the suburbs, additional services may be expensive due to the cost of installation and operation associated with low density residential development. For this reason, the actual need for additional sewer or water lines, electric transmission lines, or branch gas transmission lines will depend upon the location of new industrial and residential growth. For example, the urbanized portion of the Region could accommodate all of the anticipated population growth expected by 1990 within the capacity of the existing sewage treatment plants. In contrast, if this growth were to occur principally in low density areas of the Region, sewage services might be required (often into areas which do not merit the service but require it in order to correct septic system failures).

a. Recreation Services

The Central Naugatuck Valley Regional Planning Agency has identified 11,000 acres of land available for open space and recreation in 1975. This regional recreation land consists of all land owned by the State, federal and municipal governments and by private non-profit organizations. By 1990, assuming that 53 acres of open space and recreation land are needed for every 1,000 residents, the Region is

expected to need an additional 3,500 acres to meet the standard.¹¹ The additional acreage could be acquired through the purchase of the lands in the action areas outlined in the Agency's Recreation and Open Space Element and, in part through the reuse of landfill or sand and gravel sites that are no longer productive. However, an effort should be made to ensure that recreational sites and facilities are maintained within easy access of the urban population so that residents of older urban communities may use these facilities within their daily lives. In addition, open space areas need to be preserved in developing suburbs to ensure that recreation is available to future residents of these areas.

b. Fire Services

Currently, only two of the Region's municipalities operate with full-time fire fighters. The remainder rely on the services of volunteers or pay on a per call basis. The addition of approximately 32,000 more residents to the Region by 1990 will require improved fire fighting services and possible construction of new fire stations in some of the Region's municipalities. The municipalities of Cheshire, Watertown and Southbury have experienced rapid increases in population which may soon require the provision of full-time fire fighting personnel and expanded facilities within each town. If residential development is focused within the existing town centers, each municipality may be able to take advantage of its existing fire services and facilities with minimal need for expansion or increased spending. However, if planning and zoning commissions allow its land to be developed on large lot residential subdivisions scattered throughout the town, current fire service may be inadequate and spread too thin to provide sufficient protection.

c. Police Services

According to a study prepared by John Herder Associates titled, Six Town Police Study, several of the Region's municipalities may be in need of improved police services in the near future. The study indicated

¹¹ The standard of 53 acres per 1,000 persons is the CNVRPA's adjustment of the standards prepared by Tri-State and the State of Connecticut to reflect an average of both. See the CNVRPA Recreation and Open Space Element for a full discussion.

"The optimum size of a community (for establishing a police department) appears theoretically to be approximately 15,000 people. In this Region, the movement towards such a development occurs at a much lower population."

"Judging by the experience in the four (Middlebury, Oxford, Southbury and Woodbury) towns, the pressure to organize more comprehensive police services becomes quite strong when in face of a continued trend upward the population reached a level of approximately 7,000 people."¹²

According to the study, New England communities generally feel the need to establish a full-time police department when their population is somewhere between 7,000 and 10,000 people. Based on this estimate, Herder Associates estimated that Woodbury and Southbury will be establishing a full-time police department in a few years while Oxford will require one around 1980. Beacon Falls and Bethlehem, both serviced by resident state troopers, will probably be adequately protected for the next twenty years without an organized police department.

d. Transportation Services

CE Maguire, Inc., recently completed a short-range transit development program for the Central Naugatuck Valley Region. The report recommends an expansion of public transportation in Waterbury and its contiguous municipalities. The transit improvements are for a five-year period ending in 1981 and emphasizes modification of existing local bus routes in Waterbury, improvements in bus stops, including the provision of bus shelters, purchase of vehicles accessible to the handicapped, coordination of mini bus services operating in the Region and the purchase of mini buses in those municipalities currently without any form of public transportation. These recommendations are for a five year planning period. Additional transportation services may be required by 1990.

Specifically, as the suburban municipalities grow in population, it may become feasible to provide commuter bus service or regular feeder bus service between the

Region's secondary urban centers and the City of Waterbury. Currently, the Region's 32 mini buses, 3 taxi companies, and its 6 livery companies provide the only public transportation outside of Waterbury. However, these services will only expand and/or be replaced by regular bus service if severe gasoline shortages develop and/or the price of gasoline becomes prohibitively high, attracting automobile users to use lower cost public transportation.

Expansion of bus service could include a regular local bus route to Naugatuck, commuter service to industrial parks, shuttle buses between the Waterbury-Oxford

Airport and downtown Waterbury and regular bus runs to those municipalities with sufficient densities to support mass transportation. It is expected that Cheshire, Naugatuck and Woodbury may merit regular bus service if population growth is clustered around the existing population centers of the Region and economic disincentives make the automobile a costly form of transportation.

Finally, a staff survey indicates that increasing population growth and the growing popularity of commuting will require expansion of the existing commuter parking lots and the establishment of possibly 12 more sites within the Region.

e. Solid Waste Services

Growth in population will also require improved and expanded solid waste collection and disposal services. Currently, the Region's residents generate 260,000 tons of refuse each year;¹³ but, by 1990, despite an anticipated slight decline in per capita waste generation, the Region is expected to generate 293,223 tons of refuse a year.

Increasing volumes of solid waste not only will require more efficient collection systems, but may require alternative disposal methods. Currently, Gilbert Associates, Solid Waste Consultants for the CNV Council of Governments, have indicated that the Region's landfill sites have less usable life than some towns expect. Other towns have discovered that the real cost of disposal was really

¹³ Gilbert Associates, A Solid Waste Management Plan, December 1976, p. VI-8.

quite a bit more than the amount for it in the town budget, particularly when one considers the cost of new equipment, a new landfill site or the cost of using other town workers at the landfill.

During 1976, Gilbert engineers worked closely with the COG's Solid Waste Committee in preparing a Solid Waste Management Plan for the Region and its municipalities. Gilbert's main job was to recommend a longrange (20-year) plan that would include energy recovery, and a short range (5-year) plan that would take care of the more immediate problems until a resources recovery facility is in operation.

Gilbert recommended construction of a processing facility in the Waterbury area, with transfer stations in several municipalities. The processing facility would remove the metals and glass from the refuse, shred the rest of the waste and process it into a transportable, combustible material that could be burned together with oil in the boiler of a utility company or local industry. The location of these facilities depends on which towns participate in a statewide program being organized and financed by the Connecticut Resources Recovery Authority (CRRA). Until these facilities are built by CRRA, Gilbert recommends the sharing of some of the Region's landfills on a sub-regional basis.

Solid Waste Services

The Solid Waste Management Plan prepared by Gilbert Associates will be used as a guide by the Region's 13 municipalities for evaluating regionwide capital improvements in waste disposal and recovery that may be required over the period 1977 to 1981.

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Gilbert Associates, A Solid Waste Management Plan, December 1976, p. VI-8.

7. ENVIRONMENTAL IMPACT OF THE PLAN OF REGIONAL DEVELOPMENT

The Plan of Regional Development identifies numerous environmental constraints to future development in the Region. Increasing population growth over the last twenty-five years has intensified the demands made on the natural environment with consequent dangers to the quality of our natural resources. Immigration along with population growth has led to more construction, more roads, additional demands for water and sewage treatment facilities and an inevitable decline in the quality of productive agricultural land within the Region. These developments have not been without consequences for the environment. Construction has led to erosion of land and sedimentation of streams; increased traffic has created air pollution and noise problems, and increasing population has led to rising water consumption levels which, in turn, have increased the demands on sewage treatment plants and taxed the capacity of rivers to assimilate additional waste water. The revised Plan of Regional Development identifies seven functional areas which relate to the environment. They are: Waste Water, Water Supply, Flood Control and Prevention, Solid Waste, Air Quality, Energy and Land Use. In addition, Farms, Farmers and Farmlands: The Role of Agriculture in the CNVR, and Revenues and Ratables: Financing Government in the CNVR, evaluate respectively the feasibility of preserving agricultural land and of reforming the tax structure to protect the ecological balance between the natural and man-made environments.

a. Water Quality

There are three critical environmental issues in the CNVR - water quality, air quality and the preservation of productive farmland. The RPA has proposed numerous water quality policies designed to (1) direct and focus development in the Region; (2) protect watershed areas; (3) facilitate the provision of sewer services in higher density development areas; (4) discourage sewerage of floodplains and public water supply watersheds; and (5) assess regional growth potential on the basis of the availability of adequate capacity for the collection and treatment of sewage. (See the CNVRPA Water Supply Element, July 1975.)

These policies are intended to recognize the limit to development and population growth through the constraints of the sewage treatment plants' capacity, the watersheds' recharge capacity and the economic provision of sewer services. The clustering of development will not only protect water quality but will reduce storm runoff from watershed areas and limit the dangers of flooding within the Region. However, if implemented, the RPA's policies of clustering development may increase storm runoff and peak flood heights in the urbanized areas. As more of the topography is paved over, storm runoff will continue to increase, leading to greater sedimentation and higher peak floods downstream of the urbanized portions of the Region.

b. Air Quality

In the past, air quality was a serious problem in the CNVR. The use of high sulfur fuels along with the ubiquitous smokestacks of major industrial establishments in Waterbury and Naugatuck resulted in sulfur dioxide and total suspended particulate levels among (if not) the highest in the State and New England. These two pollutants have become less of a concern since 1973 as DEP regulations have prescribed the use of low sulfur, low ash fuel oils and as industrial activities in the Region have declined with a concomitant decrease in industrial emissions.

In 1975, the RPA identified twelve 100 ton a year industrial source polluters in the Region of which six were in violation of DEP regulations. The Air Quality Element has emphasized (1) the need for using cleaner burning fuels and (2) reduction in stack emissions. Similarly, the Economic Development Element has indirectly addressed air quality issues by encouraging the diversification of the Region's economy to minimize dependence on manufacturing activities (which tend to be large point source polluters). Diversification of the economy will alleviate industrial point source pollution but future economic activities may very well offset current improvements in air quality. The clustering of economic and commercial activities will have a positive impact on automobile related pollutants but may have a negative impact on industrial and commercial air pollutants. Decreasing distance between home and work will minimize automobile related air

pollution but the clustering of development in the urban core could increase industrial pollutants if economic growth occurs in the manufacturing sector of the economy.

Though there are no industrial air quality regulations with land use implications (comparable to the indirect source permit system for automotive pollutants), emission density zoning concepts have been proposed in recent years. In effect, emission density zoning advocates see air quality standards as possible land use control devices which could limit industrial or commercial development within an area based on the allowable air quality ceilings. For example, if air quality standards allow annual geometric concentrations of sulfur dioxide (SO_2) to reach 75 parts per million (PPM) and current level are at 73 ppm, then a new firm wishing to enter the Region would have to make assurances that it would not cause the air quality standards to be exceeded by emissions from its firm before it would be allowed to locate in the Region. The economic implications of emission density zoning might be severe for a heavily industrial area such as Waterbury with high pollution levels seeking economic development. The CNVRPA has endorsed economic development and diversification of the economy within the context of clustered development. Diversification of the Region's economy should reduce past adverse effects on air quality created by an economy largely dependent on manufacturing activities with massive annual air pollution emissions.

In contrast to industrial air pollutants, automotive air pollutants will continue to increase as the population grows and as the number of registered vehicles increase. The vehicle miles traveled (VMTs) in the Region must be reduced through (1) increased reliance on mass transportation, and (2) the clustering of residential development near commercial and industrial centers. These strategies are supported by the Air Quality, Transportation and Communications Elements which emphasize the need to develop improved public transportation between existing urbanized areas and to encourage clustered development so that public transportation is feasible. Substitution of public transit for travel by private automobile will reduce vehicle

miles traveled (VMTs) and the level of hydrocarbon emissions within the Region. However, the CNVRPA policies will have little effect on regional hydrocarbon emissions since the Agency's policies have no statutory authority nor implementation power in the realm of transportation. Furthermore, because the majority of the automotive related air pollutants measured in the CNVR are blown in from the New York metropolitan area, the CNVRPA's policies will have little or no effect on regional oxidant levels. (Oxidants are the end product of hydrocarbons and sunlight.) For the most part, oxidant levels in the CNVR and the remainder of the State are and will continue to be unaffected by State, regional or local policies. Implementation of air quality standards for oxidants will require massive federal and/or interstate effort to develop transportation control strategies which consider and resolve the effect of interstate flux of automotive oxidants on air quality standards in adjoining states.

c. Agriculture

The decline of agricultural land in the CNVR has been a recent concern of the State, Tri-State and the CNVRPA. The CNVRPA has emphasized the need to preserve agricultural land in order to maintain readily available lower cost food supplies within the State. However, the RPA's policies will require legislative direction or regulatory support if they are to have any effect on the preservation of agricultural land. The preservation of agricultural land is, strictly speaking, more properly the sphere of state government and can be dealt with more effectively at that level. However, the CNVRPA's Housing, Economic Development and Waste Water policies do encourage residential development within areas in close proximity of clustered economic activities and consequently, if implemented, may alleviate some of the pressure to sell prime agricultural land to developers in the rural hinterlands. Efforts to limit flood damages by preventing development on floodplains may also alleviate some of the pressure to sell agricultural land. The use of floodplains for agricultural uses is compatible with flood control programs and could serve as a form of land use zoning for agriculture.¹⁴ However, a comprehensive and

¹⁴ The CNVRPA has recommended that agriculture be a permitted use in all floodplains areas.

realistic solution to the decline of farmland may only be possible through the State's purchase of development rights of farmers. So far this program has been looked on with disfavor by the Connecticut legislature largely because of the extensive capital investments necessary to purchase all of the development rights of the State's productive farmland.

d. Energy

Implicit in the concept of regional form and clustered development is the conservation of energy. Since all energy sources (save solar heating and solid waste "eco" fuels) are imported, the primary strategy for energy production is energy conservation. The Energy, Economic Development, Solid Waste and Air Quality Elements emphasize the need to (1) reuse waste materials as alternative energy sources and (2) develop energy saving industrial processes, energy saving modes of public transportation and energy saving housing developments. Land use patterns which promote higher density development will reduce travel distances (and hence transportation energy consumption) and reduce residential heating bills (due to the advantages of heating multi-family units that share common walls).

However, recent development in solar heating and cooking indicate that this technology may become an important energy resource by 1990. Nonetheless, adoption of this technology will not solve the energy needs of the Region through it could reduce the cost of energy consumed for residential and industrial heating purposes.

The policies of the Plan of Regional Development encourages the reuse of solid waste for such purposes as a supplementary fuel source for utility consumers or industrial boiler plants. The Central Naugatuck Valley Council of Governments is currently evaluating the feasibility of constructing a regional solid waste recovery facility that would recycle solid waste (thereby reducing the demand to utilize virgin materials) as well as utilize the residue material as a fuel for an industrial plant in the Region. Such a facility would not only reduce the need for landfilling (and limit the attendant water and air quality hazards) but increase the energy resources of the Region.

The Plan encourages the use of electricity for home heating since it does not contribute to local air pollution emissions. This policy assumes that alternative fuels will become more important sources of electricity and that replacement of scarce fuels will eventually reduce energy costs. However, according to some energy experts, the air quality advantages of electrically heated homes are offset by the energy inefficiencies associated with the production of electricity. A federal study entitled, the Costs of Sprawl, indicates, "...although electrical energy is the most efficient source of heat for dwelling units, the lower efficiency of electric generating stations makes it significantly less efficient overall."¹⁵ Nonetheless, despite the fact that electrical energy will increase per capita energy consumption, it will also facilitate air pollution control measures. The stack emissions from one generating plant are far easier to measure and control than the numerous small point source emissions from home heating burners.

The benefits of electric power in terms of air quality and the prospects of alternative fuel sources from nuclear fusion and photo electric cells (both far less dangerous than producing energy from nuclear fusion) may compensate for the inefficient generation and distribution of electric energy. In effect, the Plan recognizes the dangers of overreliance on scarce fuel sources and consequently encourages the development of new fuel sources (e.g., solar energy) or the refinement of purification of dirty fuels (e.g., coal) which will meet air quality standards.

e. Historic Structures

There are no anticipated adverse impacts of proposed regional development policies on historic structures included within the category of National Register properties. The Agency's report, Historic Landmarks and Programs for Preservation identifies only eight National Register properties or sites including three historic districts in Woodbury and Southbury and five buildings located throughout the Region. Though no danger is posed to these eight sites, a complete and comprehensive inventory

¹⁵ Real Estate Research Corporation, The Costs of Sprawl, Literature Review and Bibliography and Detailed Cost Analyses, April 1974.

of all historic resources in the Region has not yet been undertaken. Completion of a thorough survey could very well result in the identification and recommendation of additional sites to be included within the National Register List. Early survey efforts will be required to ensure that sites or structures which may qualify for National Register property status are protected from any impending plans for development, demolition or alteration of the property or its surroundings. The CNVRPA Historic Landmarks and Programs for Preservation report encourages the preservation of valuable historic sites and structures in the Region in harmony with a balanced development of the lands zoned for commercial, residential and industrial purposes. A thorough review of existing programs for preserving the Region's historic structures and sites is included in the Historic Landmarks and Programs for Preservation report. Since the plan of development emphasizes the need for concentrating future development in the urban core and its secondary centers, special care must be taken to ensure compatibility of style, character and proportion between old and new developments.

These State policies are adopted within the CNVRPA land use element as well as in five other functional areas of the Plan. The Plan of Regional Development addresses the issues raised by the State Plan of Conservation and Development in its Water, Flood Control and Prevention, Recreation and Open Space, Water Supply, and Economic Development Elements. Furthermore, a recent publication of the Agency titled, Revenues and Ratables: Financing Government in the CNVR, addresses methods of influencing land use through changes in the existing tax structure.

While the State and regional land use policies are similar, there are some conflicts between the land use maps of the two plans. In part, the differences found between the two land use maps reflect the fact that detail and differentiation of land uses was not as easily provided on a State land use map made on a larger scale than that developed by the CNVRPA.

8. COORDINATED LAND USE PLANNING

The CNVR falls within the planning jurisdictions of several other organizations covering much broader geographic areas. The Office of Policy and Management (OPM) in Connecticut and the Tri-State Regional Planning Commission (which plans for Greater Metropolitan New York, including parts of Connecticut) have developed land use plans that cover the Central Naugatuck Valley Region. In addition, there are a multitude of State and interstate agencies which plan for specific functional areas such as health (Northwest Connecticut Health Systems Agency) or flood control (The New England River Basin Commission) and may affect the pattern of land use development within the Region.

a. State Planning

The Office of Policy and Management is responsible for revising the State Plan for Conservation and Development for Connecticut. This document, completed in 1974 and now in the process of being revised, identifies the major land and water resource policies that are to be used to guide the future development of the State. These State policies are adopted within the CNVRPA land use element as well as in five other functional areas of the Plan. The Plan of Regional Development addresses the issues raised by the State Plan of Conservation and Development in its Waste Water, Flood Control and Prevention, Recreation and Open Space, Water Supply, and Economic Development Elements. Furthermore, a recent publication of the Agency titled, Revenues and Ratables: Financing Government in the CNVR, addresses methods of influencing land use through changes in the existing tax structure.

While the State and regional land use policies are similar, there are some conflicts between the land use maps of the two plans. In part, the differences found between the two land use maps reflects the fact that detail and differentiation of land uses was not as easily provided on a State land use map made on a larger scale than that developed by the CNVRPA.

Nonetheless, though the regional land use map is not totally consistent with the State land use map, it generally reflects and supports the overall policies of the Plan of Conservation and Development. Where land use conflicts exist between the plans of the CNVRPA and OPM, efforts are underway to evaluate the conflicts.

b. Tri-State Planning

The land use policies and needs of the Region also function within the sphere of the Tri-State Regional Planning Commission. Tri-State prepared a Regional Development Guide (RDG) in 1969, updated it in 1972 and prepared a new RDG in 1977. The 1977 Guide is a land use plan for its counties and regions in New York, New Jersey and Connecticut. The Guide has three principal policies. It emphasizes (1) preservation of open lands, (2) gathering economic activities, and (3) the encouragement of self-contained communities. The two plans are in basic agreement concerning the clustering of residential development and the physical proximity of trades and services to residential development.

The Housing Element of the Plan of Regional Development encourages the channeling and clustering of residential development in close proximity to essential urban services. Similarly, Tri-State's 1977 Housing Report, People, Dwellings and Neighborhoods has encouraged residential development to fan out around non-residential clusters to increase the efficiency of land development patterns.

c. Fragmented Land Use Planning

While the land use policies prepared by the State, Tri-State and the CNVRPA are in close agreement, mechanisms for the implementation and coordination of these policies between various levels of government and planning are sorely lacking. Part of the difficulty in developing land use plans in coordination with other organizations within State and federal government has been the lack of uniform substate planning jurisdictions and the lack of decision making and implementation powers delegated to substate planning organizations such as the State's regional planning agencies. The consulting firm of Public Research and Management, Inc.

has recently prepared a study for the former Planning and Budgeting Division of the Department of Finance and Control entitled, Substate Regionalism in Connecticut. The study emphasized that the State should take a stronger leadership role in streamlining intergovernmental relationships and establishing an orderly substate structure that can complement state structure and local general purpose governments.

The need for improved coordination among various levels of government has become more serious over the last 15 years as the federal government has created numerous substate districts which have not been coordinated with state or local land use planning.

The Advisory Commission on Intergovernmental Relations in its report, Regional Decision Making and New Strategies for Substate Districts, noted the limited leadership provided by state government. It states,

"Most state governments until recently have been silent partners in regionalism. They have neither discouraged substate districting activity initiated by Federal legislation and guidelines, nor attempted to coordinate and systematize the development of area-wide bodies and the solution of problems in interstate metropolitan areas."

The Public Research and Management Study for Connecticut issued a series of recommendations aimed at encouraging the State to coordinate the objectives of Federal, State and local governments through the establishment of substate districting.

The consultant's recommendations stress that substate districting can be used to direct intergovernmental relations, avoid duplication of functions, achieve economies of scale in the use of resources through intergovernmental cooperation, and facilitate the identification of decisions and actions, which state officials should take to resolve problems and realize opportunities.

The CNVRPA has endorsed the recommendations of Substate Regionalism in Connecticut.

Fragmented land use planning has been created by the proliferation of a confusing array of limited purpose federal, state and substate agencies most of which have little or no mechanisms for cooperating or coordinating their land use related activities or capital investment programs with those of local or state government or other substate district agencies. Though land use planning in Connecticut falls within the purview of the Office of Policy and Management, there are a host of state, federal, county and local agencies which plan and make decisions with major land use consequences in the Central Naugatuck Valley Region.

At the federal level, the Environmental Protection Agency, the Army Corps of Engineers, the Departments of the Interior, Housing and Urban Development, and Transportation, and the Soil Conservation Service, all have regulatory or implementation powers which may have important impacts on regional land uses. At the interstate level, the New England River Basin Commission develops plans for watershed areas and, at the state level, the Departments of Environmental Protection, Transportation, Health and Commerce formulate policies which have significant land use development implications.

d. The A-95 Procedure

The A-95 review process is one means of coordinating land use decisions and capital investment proposals at a regional level. Applications for federal funds are constantly being reviewed by the CNVRPA to determine their environmental, social and economic impact on the municipalities within the Region. Theoretically, application of the A-95 procedure has been in the main a limited tool for controlling regional land use changes since there are not statutory powers which are not in conformity with the Agency's adopted land use plan can be delayed. However, in practice, the A-95 procedure has been in the main a limited tool for controlling regional land use changes since there are not statutory powers which are not in conformity with the Agency's adopted land use plan can be delayed. However, a single composite of the individual municipal plans of development and current zoning ordinances where municipal plans of development were not available. Current municipal plans have a great influence on regional plans as expressions of local objectives; however, the regional plan in turn, adds a broader dimension to local plans so that they are in harmony with the character and guidelines for the Region.

Similarly, zoning ordinances and maps, though limited in their use by the frequency of their revisions, are shorter term planning schemes that influence and are influenced by the regional plan.

Intermunicipal coordination in land use planning need not all occur at the regional level. Certain land use related agencies such as water authorities or health districts may function more effectively at the subregional level. As an example, the Chesprocott Health District serves the adjoining municipalities of Cheshire, Prospect and Wolcott, providing these towns with certain forms of land use regulation, such as percolation tests for possible septic system leaching fields, that may not be economically provided on a town or regional planning agency level. Similarly, the Pomperaug Water Authority functions as a subregional district since it plans for water and sewer services in five of the Region's municipalities falling within the Pomperaug Watershed Area. These intermunicipal alliances facilitate the achievement of regional land use objectives by allowing for economies of scale in the provision of services and a more equitable distribution of costs and benefits among regional or subregional users of services.

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ing the application, an overload of applications, insufficient funds available for the review procedure, and nearly non-existent regulatory power over federal funds entering the Region has seriously limited the value or the power of the A-95 process.

Nonetheless, the project notifications and review system is attempting to facilitate the development of more thoroughly coordinated plans and programs within the Region. of Health and the Department of Environmental Protection (to name a few) all influ-

ence how, where and when the land is used in the Region.

2. Taxation

However, among the factors influencing land use development, the property tax is perhaps the most significant. Property taxes have had a significant impact upon local and regional development, promoting geographic inequalities in the distribution of educational facilities, employment, housing opportunities and social services. Competition for tax rates, such as large industries has often created an inequitable distribution of the costs and benefits of public services within a region. Large industries locating in suburban communities provide increased tax revenues to municipalities allowing local governments to maintain low property taxes for residents. However, the decentralization of employment opportunities that has been stimulated by relatively low suburban taxes has in turn required adjoining municipalities to provide services and maintain transportation facilities for its residents who work in these new industries located in nearby towns.

This regional allocation of housing and employment opportunities is not complemented by a regional system of taxation that would allow equitable distribution of the costs and benefits of revenue producing property and cost producing populations among all 13 municipalities. Local property taxes often lead to competition among municipalities for attracting tax rates and methods of excluding tax liabilities from their town. The CNVRA report, Revenues and Rates: Financing Government in the CNVRA, emphasizes "certain towns will have a property tax base which will enable them to maintain a low tax rate and attract the high value, revenue producers it desires. This attraction may result in pockets of development demanding services

9. IMPROVEMENTS IN GOVERNMENTAL STRUCTURES

The pattern of land use development found in the Region is not simply a function of economic and population growth. The structure of local government, the system of local and state taxation, the regulatory powers of local planning and zoning boards and inland-wetlands commissions, and the regulatory powers of the State Department of Health and the Department of Environmental Protection (to name a few) all influence how, where and when the land is used in the Region.

a. Taxation

However, among the factors influencing land use development, the property tax is perhaps the most significant. Property taxes have had a significant impact upon local and regional development, promoting geographic inequities in the distribution of educational facilities, employment, housing opportunities and social services. Competition for tax ratables, such as large industries has often created an inequitable distribution of the costs and benefits of public services within a region. Large industries locating in suburban communities provide increased tax revenues to municipalities allowing local governments to maintain low property taxes for residents. However, the decentralization of employment opportunities that has been stimulated by relatively low suburban taxes has in turn required adjoining municipalities to provide services and maintain transportation facilities for its residents who work in these new industries located in nearby towns.

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which are at variance with the efficient provision of transportation and sewer services and with the protection of environmental quality." One inefficient spatial effect of the property tax system is "leap-frog" development. A property owner near a developing area may retain his vacant land, speculating that it will increase in value. Often this is made possible through reduced property taxes under open space or farmland classification which allows property owners to retain their land at minimal costs and force development to establish itself further away from the economic and commercial centers of the Region. The result is greater travel distances, loss of economies of scale in the provision of sewers, increased costs for the provision of services and often, underutilization of existing facilities. By tying development and urban renewal to the property tax, urban land developers are discouraged from maximizing the efficient use of land and urban services and are attracted toward suburban locations where taxes have been relatively low.

The Plan of Conservation and Development recommended a reformation of the Connecticut tax structure so as to reduce pressures on towns and cities which "contribute to deteriorating structures, urban sprawl, inability to absorb low income housing, and diseconomies of scale with respect to the location of business and industry."

Several alternative means of generating revenue have been proposed in recent years to replace or supplement the property tax. User charges, state and city income taxes and metropolitan taxes have all been mentioned as possible tools for facilitating the achievement of regional and state land use objectives.

User charges, city income taxes and metropolitan taxes can all alleviate some of the spatial inequities of services and employment opportunities created by over reliance on the property tax. However, the use of a metropolitan tax system in the CNVR would inevitably entail a metropolitan form of government based on regional planning agency or SMSA boundaries.

b. Metropolitan Government

The promulgation of metropolitan taxes would require an additional layer of government above the local level capable of making fiscal decisions and carrying out land use related activities throughout the Region. While the metropolitan form of government is foreign to Connecticut, it has been successfully implemented in numerous other areas of the country. The principal advantage of this form of government could be that regional planning and regional decision making as it relates to land uses would distribute the costs and benefits of regional services and facilities equitably among all users within the Region. The New England notion of the small town cut off from the outside world fails to recognize the clear interdependencies among the Region's municipalities for social services, health, employment, transportation, recreation, shopping and education. The Central Naugatuck Valley Region currently is served by a surrogate form of metropolitan government through the Council of Governments. However, this organization is not thoroughly effective since it depends upon intermunicipal agreement and voluntary cooperation rather than legislative authority to implement projects of regional significance. Though metropolitan government may be a somewhat distant possibility for Connecticut, the allocation of greater statutory power over land use decisions to regional planning agencies is not necessarily so unrealistic. By expanding the statutory functions of the Regional Planning Agencies to cover significant regional environmental concerns, the state could take a positive step toward overseeing the unregulated, uncontrolled and unplanned regional and state land patterns which arise from the decisions made by government agencies at the local level.

10. STAGING REGIONAL GROWTH

The Regional Plan of Development has outlined numerous policies aimed at guiding the pattern of future land uses. Specifically, the plan has emphasized methods of protecting the environment and decreasing the cost of providing services through minimizing the inefficient, inappropriate and inopportune uses of land.

Inefficient land uses such as the proliferation of large lot, low density zones near the urban core may increase the cost of providing and maintaining utilities and roads. Inappropriate land uses such as the development of an industrial park near a residential area may create aesthetic and social problems within a community. Finally, the inopportune development of land on the fringe of the metropolitan area can create additional costs for improved highways or the extension of sewers, without the economies of scale associated with an urban location.

The pattern, intensity and timing of growth all have a bearing on the cost of land development, the provision of services, and the quality of the environment. The pattern of land development recommended by the Regional Plan is graphically presented on the Regional Land Use Map. This pattern of regional development reflects the historic development of the Region and municipal plans of development modified, in part, by the environmental constraints of soil suitability and sewer services.

The following discussion sets forth broad guidelines for staging growth and mechanisms that can be used to influence regional growth patterns. Though, properly speaking, most land use programs remain in the hands of local government officials and planning and zoning commissions, the CNVRPA has set forth specific guidelines for land use development which can be used to coordinate the land use programs created at the local, regional, state and federal levels. Municipalities are provided with specific suggestions on land use development through the CNVRPA's statutory referral process and the broad policy guidelines outlined in the Revised Regional Plan of Development.

a. Intensity of Growth

There are several mechanisms that can be used to influence the intensity of development within the Region: the provision of sewers, the provision of public water lines, air quality constraints, soil suitability limitations, population projections and zoning ordinances.

Of these land use control mechanisms, the most effective one for guiding the intensity of growth has been through the decision to provide or not provide sewer services. When sewer services are available or planned for an area, development can occur at much greater densities than when septic systems are used as the primary means for the disposal of human wastes.

The Office of Policy and Management has also emphasized that the intensity and staging of urban growth may also depend upon the environmental constraints of water and air quality. The Plan of Conservation and Development for Connecticut states:

"Part of the solution to the stream pollution problem lies in relating the location, amount and staging of urban growth to the ability of the stream to accommodate such growth."¹⁶

The stream's capacity to dissolve wastes discharged by sewage treatment plants sets an upper limit on the quality of sewage (and consequently the population) produced within an area. If the stream is incapable of accommodating additional waste loads, there may be only two solutions -- a halt to all further development or increased costs for tertiary or best treatment facilities to serve the area.

Growth in the Region is constrained by the stream quality limitations on the Naugatuck River. The waste treatment plants for Thomaston, Watertown, Waterbury, Naugatuck, and Beacon Falls serve approximately 150,600 persons and have the capacity to serve another 58,200 persons. In 1973, the public sewage treatment

¹⁶The Proposed Plan of Conservation and Development, State of Connecticut, Department of Finance and Control, Office of State Planning, January 1973, p.22.

facilities in the Region had an estimated average daily flow of 26.7 million gallons per day (MGD) with a designed capacity for 35.2 MGD. Further growth is limited to the remaining 8.5 MGD under existing treatment methods. However, the population served by sewers could be increased depending on whether Waterbury's storm drainage system is separated from its sewer lines and the extent to which the additional capacity of the Region's sewage treatment plants is used to serve business or industrial facilities or whether it is exclusively used to serve residential areas.

Air Quality

The intensity of growth in the Region may also be constrained by air quality considerations. In order to maintain National Air Quality Standards for Hydrocarbon, the State Department of Environmental Protection had developed air quality regulations designed to limit, modify or halt the construction of all proposed roads and modifications of roads which would result in an increase of 1000 vehicles per hour per lane. In addition, the Department of Environmental Protection also regulates construction at airports where there are 50,000 or more commercial flights a year. These regulations could limit urban growth only to the extent to which increased urban growth creates increased levels of automotive air pollutants which could not be reduced through improved traffic signalling, widening of highway and other traffic improvements designed to improve vehicle flow. These regulations are most applicable in the urbanized portions of the Region where traffic volumes have reached or are exceeding the design capacity of local and state roads and where improvement might be expected to generate greater use of the road. Specifically, these regulations are most applicable to limited access highways which are reaching their design capacity. In the CNVR many of the proposed roads and road modifications identified as of highest priority in the CNVR Transportation Plan: 1977-1985 will probably increase the hourly volumes of vehicle travel but will not increase these volumes beyond 1000 vehicles per hour per lane. Consequently, the Department of Environmental Protection's air quality regulations may have little impact on land uses and lands adjacent to roads in the Central Naugatuck Valley Region. Furthermore,

the Waterbury-Oxford Airport will probably not be effected by these regulations prior to 1990 because there are no commercial flights operating there now nor are any expected to be operating which would result in over 50,000 commercial flights a year.

Though the Department of Environmental Protection's air quality regulations currently only apply to automotive and aircraft pollutants, the Federal government is currently considering the adoption of air quality legislation which might control land uses in order to prevent significant deterioration of air quality. The proposed regulations apply to industry and are designed to limit sulphur dioxide and total suspended particulate emissions to ensure that ambient air, which is considerably cleaner than national air quality standards, is maintained at that level even when air quality standards allow for additional deterioration.

In effect, these regulations could function as a broad statewide and nationwide system of zoning to limit additional industrial growth to those designated air quality control regions which have the capacity to absorb additional industrial pollutants without exceeding air quality standards. Further, industrial growth in the CNVR could be limited by these proposed regulations if new industries entering the Region contribute to the deterioration of current air quality.

Soil Suitability

The land suitability analysis presented in Appendix A outlines the limitations to land development based on soil types. Present development patterns in the Region are largely the result of the wide range of land conditions that exist. Land suitable for development and easily traversed by roads has developed to a far greater extent than the rocky ridges and low wetlands which present unsuitable conditions for development.

Varying soils and slopes have to a great extent determined the density of development possible within an unsewered municipality and established criteria for ultimate

development of the land. The CNVRPA has established three land categories of suitable, conditionally suitable and unsuitable land to assist municipalities in setting standards on the intensity of growth capable of being accommodated on different soils and slopes. These categories of land use limit residential development to one household per acre in suitable areas, one household per 2 or 2-1/2 acres in conditionally suitable land and one household per 16 acres in areas of unsuitable land (provided that pockets of good soil are present for septic system leaching fields). A full discussion of the soil types that are listed under each soil condition category is provided in Appendix A.

However, land suitability alone does not determine the pattern of future growth in the Region. Growth pressures are more often determined by man's provisions of transportation routes, municipal facilities and services (esp. sewers), tax rates, economic incentives, zoning and subdivision regulations. The land suitability analyses does, however, indicate the availability, suitability and location of land for development. Soils which have only slight limitations for septic systems can be developed at higher residential densities than soils which have moderate limitations. If, however, both groups of soils are served by municipal sewerage systems, the septic system limitations factor is no longer relevant.

Population Projections

Ironically, one critical factor influencing the growth of the Region is its population projections. Projections of expected population are one of the most often used tools for justifying capital expenditures for schools, sewers, transportation facilities and other structures within a municipality. When a municipality forecasts rapid population growth, it may attempt to anticipate and accommodate such growth through changes in its zoning and subdivision regulations permitting higher density development and by extending sewer lines to concentrate growth within a more confined area of the town. Since the population projections most often used by the towns are those developed by the CNVRPA, the staging of residential, industrial and commercial growth is most often influenced by the

staging of population growth. The population projections developed by the CNVRPA implicitly operate to stage growth in each municipality since they provide an estimate of the possible demand for service, facilities and land. At the town level, these estimates may then be translated into capital investment strategies, or zoning and subdivision changes to focus this population growth, minimize costs of public or private development and the provision of services. In this sense, the Agency's population projections for the CNVR are one of the most influential mechanisms for staging growth. These projections are set forth in Table 2-4.

TABLE 2-4: CNVR Total Population Projections,
by Municipality: 1950-1990

Municipality	Total Population						
	U.S. Census ^a (April 1)			Estimate ^b (July 1)		Projection ^c (July 1)	
	1950	1960	1970	1976	1980	1985	1990
Beacon Falls	2,067	2,886	3,546	4,000	4,000	4,200	4,300
Bethlehem	1,015	1,486	1,923	2,200	2,300	2,500	2,600
Cheshire	6,295	13,383	19,051	21,700	24,600	27,700	30,500
Middlebury	3,318	4,785	5,542	6,200	6,400	6,800	7,100
Naugatuck	17,455	19,511	23,034	25,200	25,800	26,900	27,800
Oxford	2,037	3,292	4,480	5,400	5,600	6,200	6,700
Prospect	1,896	4,367	6,543	6,800	7,800	8,400	9,000
Southbury	3,828	5,186	7,852	12,000	12,800	13,700	15,100
Thomaston	4,896	5,850	6,233	6,300	6,600	6,800	7,000
Waterbury	104,477	107,130	108,033	[113,900] ^c	110,400	111,300	112,300
Watertown	10,699	14,837	18,610	19,400	21,500	22,800	23,700
Wolcott	3,553	8,889	12,495	13,200	15,100	16,300	17,400
Woodbury	2,564	3,910	5,869	6,700	8,000	9,100	10,100
CNVR	164,100	195,512	223,211	243,000	250,900	262,700	273,600

Sources: ^aU.S. Bureau of Census, Census of Population: 1950-70.

^bConnecticut Department of Health Estimates with CNVRPA adjustments.

^c1976 Connecticut Department of Health estimate is probably high.

The U.S. Bureau of the Census estimated a slight decline in Waterbury's population between 1970 and 1975. Using a straight line interpolation of the 1970 Census population and the 1980 projection, Waterbury's 1976 population would be 109,400.

Zoning Ordinances

Local governments can also control the intensity of growth by the zoning requirements established for residential, commercial and industrial land uses. The CNVRPA Housing Element has encouraged flexibility in municipal land use regulations to allow for cost saving residential development concepts such as clustering since more intensive use of residential lands will facilitate the provision of low cost community services and facilities and conserve agricultural lands. The Housing Element reinforces the land use objectives of this Report by focusing residential development in the established urban areas with a subsidiary level of residential development in the secondary centers. The modification of existing zoning ordinances to ensure that multi-family housing has an equal standing with single family housing in current residential zoning ordinances will facilitate a more intensive use of the Region's land.

b. Timing of Growth

The inopportune development of rural areas caused by "leap-frog" and sprawl development patterns can, to some degree, be limited by the decision to provide sewer services. When sewer service is made available in low density areas, residential and commercial development is accelerated often leaving large pockets of undeveloped land isolated between suburban towns and the urban core of the Region. These isolated pockets of land may be unusable or inappropriate for further development because of the premature characterization of the surrounding area resulting from "leap-frog" development. The staging of urban growth through the provision of sewer services is one means of encouraging clustered development. However, growth can also be staged through other devices as well. The decision to zone a municipality for excessive industrial land, or for residential lot sizes which are exclusionary (by virtue of cost), can also effect the rate at which development occurs.

While such policies can be exclusionary in nature, if they are designed to limit population growth to protect the tax revenues of local residents, they may also

reflect sound environmental land use considerations. As an example, in areas designated as conditionally suitable land, the Land Use Element recommends residential development at a minimum of one household per 2 or 2-1/2 acres in areas where neither sewerage or water services are available. In areas of unsuitable land conditions, such as poorly drained soils, the land suitability analysis recommends residential development to be at one dwelling unit per 16 acres. Though these soil limitations cannot function to stage growth, arbitrary and fiscally exclusionary up-zoning of lot sizes can and has functioned as a means to stage local land development. However, this mechanism, like overzoning for industrial land, does not reflect sound environmental or social considerations. A better approach to staged growth in the Region is presented in the Waste Water Element of the Regional Plan of Development. This element emphasizes that municipal governments can control the rate of growth in their municipality by requiring certification of the availability of adequate capacity for the collection and treatment of sewage as a prerequisite for subdivision approval or building permits. The Waste Water Element discourages the provision of sewer services at densities of less than 2 dwelling units per acre in order to reduce the costs of services and control residential growth.

The rate of uncontrolled urban and suburban growth can also be limited by a town's open space policies and by local and state preferential tax assessments for farm, forest and open space land. Under P.A. 490, the State has attempted to protect farm, forest and open space land by easing the tax burden on these lands to reflect use values rather than fair market values. This act has been an important land use control device that has not only preserved farm and forest land but has slowed the rate of suburban growth. A Department of Environmental Protection study entitled, An Evaluation of Public Act 490, indicates that this act has played an important role in limiting urban sprawl. It states:

"By easing the tax burden on classified lands through use value rather than fair market assessment practices, the Act has relieved some of the growing pressure to convert undeveloped land to more intensive uses.

"Although P.A. 490 was not designed to reserve lands in perpetuity, all available evidence indicates that it has been successful as a limited range tool in buying years of time to study the problems of growth and to develop ways of accomodating orderly development without undue environmental costs."¹⁷

c. Priorities in the Staging of Growth

The Regional Plan of Development encourages residential, commercial and industrial growth to be focused toward the urbanized portion of the Region, including Waterbury, Watertown and Naugatuck. These areas are provided with public utilities that can be extended at economical costs to serve a greater portion of the Region's expected population growth. The Region's secondary centers are the second priority for residential development. However, growth of industry in the suburban industrial parks (when in accordance with clustered development policies) is a high priority. The historic decline in manufacturing in the Region coupled with a large outmigration of the Region's residents to other labor market areas (approximately 20% of the Region's residents worked outside the Region in 1970) clearly indicates that the Region must attract new industry to remain a viable economic and employment center. Otherwise, future growth in the Region may be limited to providing more housing and related services making this a "bedroom region" for the metropolitan areas of Hartford, New Haven, Bridgeport and Danbury. In part, the slow growth in employment within the Region has meant that this Region has a larger percentage of workers traveling to other labor market areas than the State's three largest SMSAs or the State as a whole. By emphasizing industrial development as the first priority, the Region may be able to reverse this trend and increase its economic vitality.

While industrial development has a high priority, it should take place within the existing economic centers of the Region to limit inefficient land use patterns whenever possible. If implemented, clustered development of industrial and resi-

¹⁷Department of Environmental Protection, An Evaluation of Public Act 490, 1976, p.40.

dential lands can take some of the pressure off owners of agriculture and mineral extraction lands thereby ensuring a supply of food and minerals from within the Region. In the case of sand and gravel sites, once these areas have been mined and reclaimed, they can be reutilized for other land uses. However, in order to ensure that sand and gravel deposits are protected from development, these minerals must be mapped and local officials must stage the development of these zones to maximize the use of these earth resources and minimize adverse environmental impacts upon adjoining land uses.

If clustered industrial development occurs in the urbanized portion of the Region and population growth is channeled to areas where sewer services can be provided economically, then agricultural and mineral extraction operations may be able to remain viable commercial entities within the Waterbury metropolitan area. The historic decline in manufacturing in the Region coupled with a large outmigration of the Region's residents to other labor market areas (approximately 20% of the Region's residents worked outside the Region in 1970) clearly indicates that the Region must attract new industry to remain a viable economic and employment center. Otherwise, future growth in the Region may be limited to providing more housing and related services making this a "bedroom region" for the metropolitan areas of Hartford, New Haven, Bridgeport and Danbury. In part, the slow growth in employment within the Region has meant that this Region has a larger percentage of workers traveling to other labor market areas than the State's three largest SMSAs or the State as a whole. By emphasizing industrial development as the first priority, the Region may be able to reverse this trend and increase its economic vitality.

While industrial development has a high priority, it should take place within the existing economic centers of the Region to limit inefficient land use patterns whenever possible. If implemented, clustered development of industrial and real-

D. The Timing of Development: Accomodating Growth between 1978 - 1990

In order to plan for an orderly development of the Region's land for residential, industrial and commercial purposes, growth must be timed to ensure the most efficient use of existing utilities, maximize access to major transportation facilities, optimize the use of municipal revenues, minimize unnecessary travel and protect natural resources.

Residential Development: The factors which have been evaluated in determining where residential growth should occur first are presented in Appendix I and listed in summary form below:

1. Acres proposed to be sewered under the Regional Plan of Development: (30%)

This factor reflects municipal plans for sewerage at the ultimate development of the Region. It includes existing and proposed acres of sewer service areas since development is not only emphasized in the established urban center but in areas expected to have the greatest capability of supporting high density growth;

2. Population growth, 1975-1990: (10%)

The projected population growth of the Region's municipalities is a measure of the current trends expected to occur over the next 12 years. While this factor acknowledges that market forces have a strong influence on the timing of development it has been given less importance in the overall equation largely because current trends may lead to undesirable patterns of development creating an inefficient use of the Region's utilities.

3. Percent of holding capacity available by 1990: (30%)

Holding capacity is defined as the ultimate population capable of being accomodated within a municipality based on the limitations to development created by soil conditions and the capacity of sewage treatment plants. The percent of each municipality's holding capacity expected to be available by 1990 has been ranked in order to ensure that municipalities which are reaching a saturation point for development are not given any incentives for future

residential growth. However, if the capacity of sewage treatment plants should

be expanded in the future then the ultimate holding capacity will also be

increased. The municipalities with less than 15% of their holding capacity

available in 1990 to support additional growth are deemphasized as locations

for short-term residential development. This indicator stresses the need to

maintain some open space in municipalities with little available holding

capacity. Furthermore, overdevelopment, defined as development beyond 85%

of a municipality's holding capacity, is discouraged since it increases the

possibility of development occurring on wetlands, steep slopes and areas of

shallow bedrock, tends to increase the amount of water runoff from impervious

surfaces (leading to a greater possibility of flooding, erosion and water

pollution) and results in a greater likelihood of septic system failures.

4. Least tax burden of public education, 1975: (20%)

This indicator measures the relative burden of financing public education

through property taxes. Municipalities which experience the least tax burden

from providing public education are the most capable of financially supporting

additional residential development with its attendant costs. Distributing

future residential growth on the basis of this variable will tend to equalize

the burden of financing public education within the Region. Educational

expenditures are considered to be the most accurate indicator of fiscal

capabilities since it constitutes the largest municipal expenditure for public

services. Other municipal services such as police, fire, recreation, public

work, etc, vary by municipality and therefore, do not reflect fiscal capabilities

as much as they reflect differences in desired levels of service. However,

beyond 1990 it is expected that a state income tax and/or readjustments in the

formula used to allocate state funds for education (reflecting the recent court

decision of Horton vs Meskill) will sharply alter the method of financing

public education and consequently change the importance of this variable as a

determinant of growth.

5. Total Non-Agricultural Employment, 1975: (10%)

Residential development must be tied to existing locations of non-agricultural employment in order to minimize the energy consumed in the journey-to-work trip and to maximize the accessibility of the labor force to employment opportunities. A closer relationship between job opportunities and housing will increase the opportunities for clustering development in accordance with the Regional Plan of Development.

Allocation of Weights:

The two most important considerations in the shared growth formula for determining municipalities most suitable and capable of accomodating short

term residential development are: (1) the protection of the environment (holding capacity available by 1990) (30% of the weighting) and (2) the density of development allowed through sewerage (30% of the weighting). Overdevelopment poses dangers to health, creates flooding, erosion and sedimentation problems and increases the chances of having septic systems placed on unsuitable soils. Development which is channelled to sewerred areas will eliminate many of these problems and will also allow for greater densities than would other-

wise be possible through the use of a septic system. Though certainly important, a municipality's fiscal capability of supporting growth has been given less weight (20%) because in the long run this factor is probably less critical than protecting water resources and open space. Furthermore, this variable may tend to increase the costs of sprawl largely because it is the suburban municipalities which are the most capable of supporting public education. Population growth has been given the lowest weighting (10%) largely because it measures expected trends which may create undesirable patterns of development. Similarly, current levels of non-agricultural employment has only been given a weighting of 10% because the location of job opportunities is not a strong constraint to housing choice as long as the private automobile remains the principal mode of transportation for the journey-to-work.

While the Central Naugatuck Valley Regional Planning Agency population projections on Page 50 indicate that Cheshire, Watertown, Wolcott, Woodbury and Southbury are expected to have the largest population growth over the next 12 years, not all of these municipalities are suitably served with public sewers. This indicates that a simple acceptance of population trends is not a sufficient basis for timing the Region's residential land use development.

Based on the shared growth formula, short term residential development should occur first in Middlebury, Southbury, Naugatuck, Cheshire and Waterbury. These municipalities have the greatest capacity to financially support and accommodate additional residential growth and the greatest level of nearby employment opportunities. The actual location of development within these municipalities should be directed to those areas which allow for the most suitable integration of new residential structures into existing utilities, transportation facilities and community facilities. The map of the Regional Plan of Development has identified these areas as light yellow, signifying their immediate suitability for short-term development at urban low densities of 2 to 4 dwelling units per net acre.

Over the period 1978 to 1990 residential development may be influenced by the approaching economic growth coming from the New York metropolitan area to the West. However, a mere acceptance of the anticipated trend could pose serious issues in Woodbury, Southbury, Oxford and Bethlelem where agricultural activities are major users of land and sand and gravel resources are quite plentiful. It is important that the large supply of sand and gravel available in the Western portions of the Region be protected so that these resources will in the future be available locally for road and housing construction. Development beyond 1985 should be directed to the western and southwestern portions of the Region after Oxford develops its industrial park with sewers and improved highway access to Route 8.

Growth in Oxford and the eastern portions of Southbury should not be encouraged unless sewer services are provided from Middlebury, allowing residential growth to continue as an extension of the pattern of residential development occurring in the western portions of Middlebury between 1978 and 1985. If residential growth is phased according to the availability of utilities, this will minimize the need for additional sewage treatment plants and pumping stations and may promote the development of transit supporting densities in the western portion of the Region.

Though Waterbury has some remaining capacity for residential development beyond 1990 this capacity is based on the Central Naugatuck Valley Regional Planning Agency's assumption that tertiary treatment will occur at the Waterbury sewage treatment plant. The Waterbury City Engineer has indicated that Waterbury has no plans of developing a tertiary treatment plant in the foreseeable future. However, the Connecticut Department of Environmental Protection may require Waterbury to go to tertiary treatment in order to handle any additional demand for service created by failing septic systems. If this should occur then Waterbury would continue to be an important residential growth center beyond 1990 when tertiary treatment is most likely to be required. In the interim the municipalities which share Waterbury's treatment plant (Wolcott and Watertown), should not become residential growth centers.

In effect, without a tertiary treatment plant available to serve Watertown and Wolcott, short-term urban residential growth must be shifted to the surrounding municipalities of Cheshire, Southbury, Middlebury, and Naugatuck where the shared growth formula indicates the greatest fiscal capacity and holding capacity to accomodate residential development.

Finally, the shared growth formula indicates that short-term residential growth must be directed away from the municipalities of Bethlehem, Thomaston, Wolcott, and Prospect due to the fact that these municipalities are anticipated

to have either the least remaining holding capacity by 1990, the least capability of financially supporting growth, the smallest sewer service areas, or the least active economic growth centers in the Region.

Industrial Development:

Generally, the decision as to where and when industries should locate in a Region is left to the private sector and local government. Industrial development plans in the Region tend to reflect competing local interests for tax rates rather than a rational evaluation of the needs and opportunities which may exist within the labor market area. In order to determine where industrial growth should occur first, the Central Naugatuck Valley Regional Planning Agency has developed a shared growth formula for industrial development which attempts to balance each municipality's needs for growth with its opportunities.

The opportunities and needs which have been evaluated in determining where industrial growth should occur first are listed in Appendix J and presented in summary form below:

I. Opportunities

1. Availability of utilities in industrial zones, 1977: (20%)

The availability of sewer, water and gas service are important considerations to firms seeking to locate in the Region. This indicator is based on an analysis of the percent of land in industrial zones which has sewer, water and

gas services. The formula gives greatest emphasis to the presence of sewer services over water services and greater emphasis to water service over gas distribution lines. This reflects the fact that sewer services are the critical variable for determining the intensity of industrial development.

Water services are also an important consideration for large firms requiring process water, while gas distribution lines may offer (if hookups are allowed) energy cost savings in the production process. The availability of these utilities indicates that a prospective firm has the immediate opportunity of locating in a particular municipality.

2. Vacant buildable land zoned for industrial development, 1975: (10%)

Vacant industrial land with soils suitable to support a septic system leaching field and located on slopes of less than 8% have been defined as vacant buildable land. The availability of a plentiful supply of easily developable industrial land provides prospective industries with the opportunity to choose locations where development costs are the least and future expansion is most feasible. This factor tends to give greater weight to suburban industrial zones since these areas have a greater amount of vacant buildable land.

3. Hours of public bus service, 1975: (10%)

The number of hours of daily bus service provided by inter-city and local bus companies indicates which municipalities offer alternatives to the use of the automobile for the journey-to-work trip. Access to the Region's labor pool is reinforced by encouraging industrial development in those municipalities which have the greatest level of public bus service. This is especially true for firms desiring to maximize their access to unskilled and blue collar workers. Locating industry in those areas where there is public bus service not only insures a fuller utilization of the existing public transportation network but allows lower income persons to have greater access to the Region's expanding job opportunities.

II. Needs

1. Financial burden of public education, 1975: (20%)

One of the traditional methods used by local governments desiring to halt rising personal property taxes has been to attract large tax producing firms to their municipality. The clearest indication of a municipality's need for tax ratables is its burden in financing public education. Public education expenses range anywhere from 49% of the property tax levy in Middlebury to 71% of the tax levy in Cheshire. The municipalities which are faced with the greatest burden of providing public education are expected to need industrial ratables the most. In effect as long as the property tax remains the principal

method of financing local government, the competition for industrial tax
ratable will continue to be a significant determinant of regional land use
patterns.

2. Expected not to commute, 1975: (20%)

"Expected not to commute" measures the number of workers in each municipality
who commute to employment centers in other towns who could be expected to
work in their home town if suitable employment opportunities were available.
Locating industry in areas where commuting is heaviest will minimize the use
of the automobile, increase the proximity of the labor force to employment
opportunities and discourage suburban sprawl.

3. Employment growth, 1975-1990: (20%)

Projected growth in employment is a measure of the accessibility of each
town's industrial zone to population concentrations and major highways and
reflects the availability of industrially zoned land. While this variable
evaluates the accessibility of the labor force to industrial zones it also
is a surrogate measure of truck access to each zone. Municipalities which
are expected to have large growths in employment have been given the greatest
emphasis in the formula.

Allocation of Weights

An effort has been made to balance the concerns of chief elected officials with
those of planners and prospective industries in determining which variables should
play the greatest role in determining those municipalities most suitable and
capable of accomodating short-term industrial development. The need for tax
ratable (as measured by the financial burden of public education) is a strong
concern of local governments. However, this factor has been given the same level
of importance as (1) the availability of utilities in industrial zones (a strong
concern of a prospective industry), (2) the expected number of workers who would
not commute if employment opportunities were available in their municipality (a

strong concern of land use and transportation planners), and (3) the expected employment growth for each municipality (a concern of chief elected officials, planners and prospective industries). Lesser weight has been given to the variable vacant buildable land zoned for industrial development largely because this variable tends to reinforce the advantages of suburban locations where vacant buildable land is most readily available but which may encourage the further decline of the urban core. While hours of public bus service measures the opportunities for reducing the use of the automobile in the journey-to-work trip, it has only been given a weighting of 10% largely because mass transit is not a strong constraint for a firm wishing to maximize its access to the labor force.

Based on the above factors and weightings the industrial areas in Waterbury, Cheshire, Naugatuck, Wolcott, and Watertown are the immediate priority development areas over the next 12 years. Short-term economic development must be focused in these municipalities to optimize the utilization of existing public facilities (such as public transportation) and utilities (sewer, water and gas). These municipalities are well served by Interstate 84 and Route 8 and are within close proximity to the Region's labor force.

Economic development along the north-south Central Naugatuck Valley corridor will be reinforced by the reconstruction of Route 8 from Seymour to Naugatuck in the early 1980's. At that time, industrial development must be emphasized in Beacon

Falls since it will then be provided with greater access to markets along the southern Connecticut coastline and in the New York Metropolitan area.

Beyond 1985, economic development in the Region must be directed toward the western portion of the Region. Oxford and Middlebury must not be intensively developed for industry until such time as sewers are extended to those industrial zones without them.

Furthermore, once the Waterbury-Oxford Airport (1) lengthens its runway so as to accomodate larger corporate jets, (2) is provided with additional tie-down space

and (3) develops commuter airline service, the western portion of the Region will offer a stronger locational advantage to high technology firms and firms seeking to establish a corporate headquarters in Connecticut. These airport improvements are expected to be operational by the mid 1980's and will offer New York firms migrating to Connecticut clear advantages over other areas in the Region and the State.

Finally, the shared growth formula for industrial development indicates that Bethlehem, Woodbury and Southbury offer the least advantages and also have the least need for industrial development. These three municipalities are considered neither short-term nor long-term industrial growth centers. Directing development

away from these municipalities will minimize any further decline in productive agricultural land in the Region since most of the Region's active farmland is located in Bethlehem, Woodbury, and Southbury.

Commercial Development

Commercial development will primarily be timed according to population growth since the market is the primary determinant of commercial growth. While convenience goods stores are necessarily of subregional concern, the larger shopping centers, malls and plazas which have a regional market must be developed to be consistent with the intensity and pattern of the Region's existing and anticipated residential development.

Since the shared growth formula indicates Waterbury, Cheshire, Middlebury, Naugatuck, and Southbury as the appropriate locations for short-term residential growth they

must also be considered the most appropriate locations for short-term commercial expansion as well. The development of regional commercial centers must be directed first to Waterbury, Naugatuck and those portions of Middlebury and Cheshire where public bus service could be extended. Regional commercial centers must be directed

away from those municipalities whose highways are not capable of supporting the additional automobile travel and which are not provided with public bus service.

Public transportation must be one of the most significant criteria for determining where regional commercial facilities (which may indirectly affect air quality) should be constructed. Based on the possible air quality constraints and road capacity limitations created by establishing a regional shopping center in the Central Naugatuck Valley Region only two municipalities, Waterbury and Naugatuck, are the most appropriate sites for short-term commercial development.

Comparison of Locations Targeted for Short-Term Residential and Industrial Development

Municipalities which are considered appropriate locations for short-term residential development are generally also slated for short-term industrial development as well. As can be seen in the Table on the next page the first priority areas for residential and industrial development both include Waterbury, Naugatuck, and Cheshire.

Middlebury and Southbury are slated for short term residential development (largely due to their available holding capacity and fiscal capacity to generate tax revenues) but not for industrial development while Wolcott and Watertown are slated for short-term industrial development (largely due to the availability of utilities, industrial land and accessibility) but not for residential development.

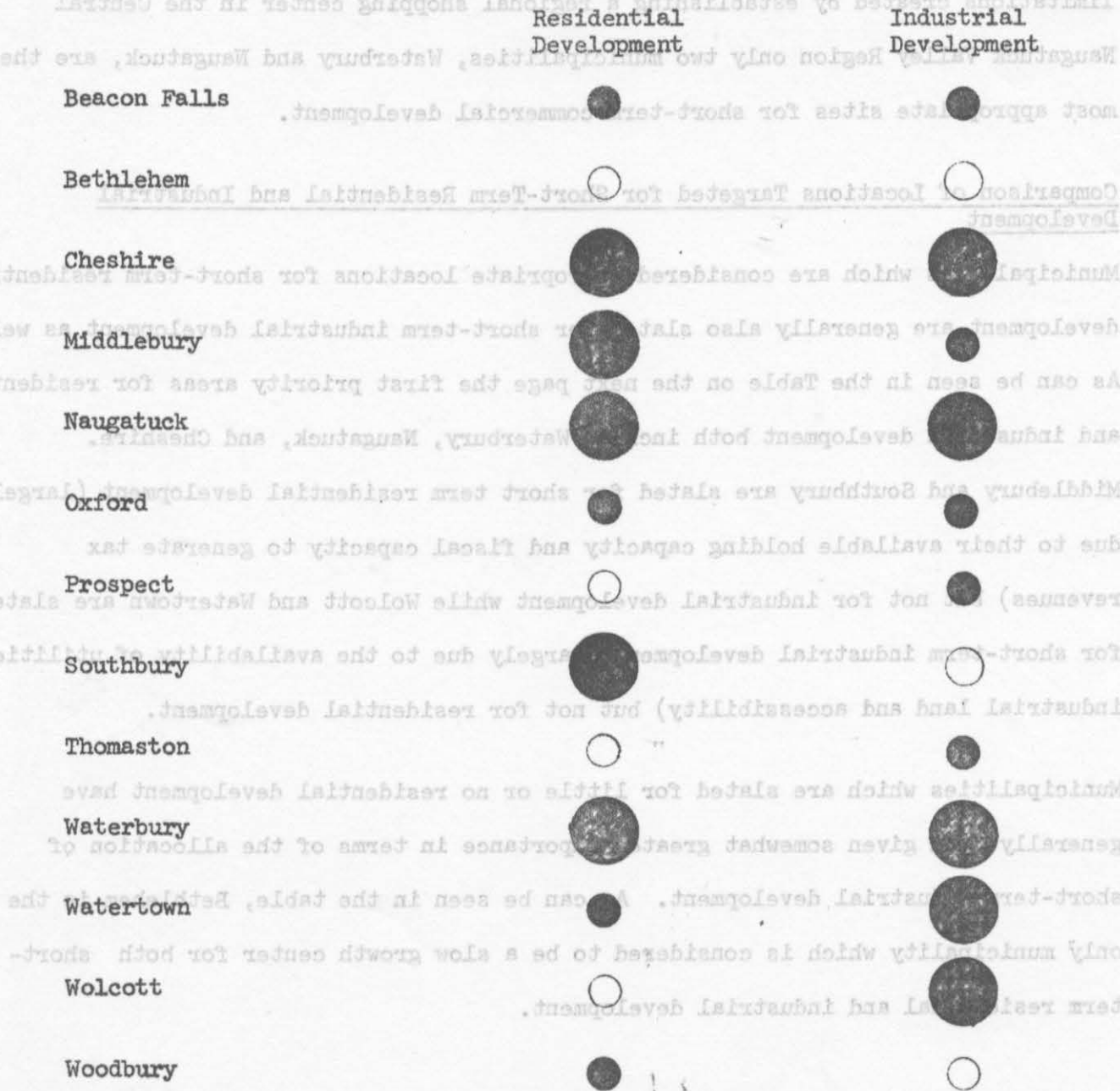
Municipalities which are slated for little or no residential development have generally been given somewhat greater importance in terms of the allocation of short-term industrial development. As can be seen in the table, Bethlehem is the only municipality which is considered to be a slow growth center for both short-term residential and industrial development.

Municipalities slated for immediate growth before 1990 (short-term)

Municipalities slated for growth after 1990 (long-term)

Municipalities slated for little or no growth

Comparison of Locations Targeted for Residential and Industrial Development in the CNVR



- Municipalities slated for immediate growth before 1990 (short-term)
- ◐ Municipalities slated for growth after 1990 (long-term)
- Municipalities slated for little or no growth

E. The Limits to Growth: Holding Capacity of the Plan of Regional Development

Despite the fact that 68% of the Region's land is underdeveloped, unused, reserved or in water bodies, there is a limit to how much additional growth can occur. Constraints on development are created by the capacity of the Naugatuck River to clean sewage; perceived social attitudes toward living space; regional land conditions (including soils, slopes, floodplains and water supply lands); the physical relationship between various land uses and present day technologies of waste disposal; residential construction and transportation systems. These factors have been the basis for establishing a regional holding capacity representing the ultimate household population that will result from the full development of the Region according to the Plan's land use allocation at some time in the foreseeable future. That is, it shows numerically the magnitude of growth capable of being achieved within the environmental constraints of the plan. The principal growth policy of the plan is that population growth should be directed to areas which can best meet the demands created by growth.

If changes should occur in any of the factors which have established future land allocations, then alterations will be made in the upper limits to the Region's growth. However, the upper limit to growth should be a useful long-term planning guide since it is assumed that the factors used to establish future land allocations in the Region will not vary over the next 25 to 30 years. Although it is premature to establish a regional policy aimed at limited growth, there is a definite need to determine whether or not projected future populations can be contained in the Region. In other words, can the Region handle likely future growth within the constraints established by the plan's future land use allocations?

Based on the procedures outlined in Appendix C (procedure for calculating the holding capacity of the Regional Plan of Development) the Region should have no difficulty in accommodating projected population growth expected in 1990 or the year 2000. The Plan's ultimate household holding capacity is 381,071 with a possible

high of 440,203 and a low of 321,929. Table 2-5 presents the computed holding capacity figures for the Region and each municipality for the 1975 Regional Plan of Development and for the 1964 Regional Plan.

For the year 2000, the Connecticut Department of Planning and Energy Policy, in cooperation with the CNVRPA, projected a total population of 287,000 for the CNVR. Within this time frame, it is clear that the implementation of the Regional Plan's Land Use policies and land use allocations will more than adequately handle this projected growth. Thus, the policy of permitting growth, but guiding and channeling it can be maintained within the framework of the Regional Land Use Plan.

It shows numerically the magnitude of growth capable of being achieved within the environmental constraints of the plan. The principal growth policy of the plan is that population growth should be directed to areas which can best meet the demands created by growth.

It changes should occur in any of the factors which have established future land allocations, then alterations will be made in the upper limits to the Region's growth. However, the upper limit to growth should be a useful long-term planning guide since it is assumed that the factors used to establish future land allocations in the Region will not vary over the next 25 to 30 years. Although it is premature to establish a regional policy aimed at limited growth, there is a definite need to determine whether or not projected future populations can be contained in the Region. In other words, can the Region handle likely future growth within the constraints established by the plan's future land use allocations?

Based on the procedures outlined in Appendix C (procedure for calculating the holding capacity of the Regional Plan of Development) the Region should have no difficulty in accommodating projected population growth expected in 1990 or the year 2000. The Plan's ultimate household holding capacity is 381,071 with a possible

TABLE 2-5: Household Population Holding Capacity
of the Central Naugatuck Valley Region
by Municipality

Municipality	Holding Capacity			1964 Plan of Regional Development
	1975 Plan of Regional Development			
	Low	High	Mean	
CNVR	321,929	440,203	381,071	399,000
Beacon Falls	6,492	10,094	8,293	18,000
Bethlehem	10,367	10,721	10,544	8,000
Cheshire	25,691	37,703	31,697	42,000
Middlebury	14,189	20,714	17,452	21,000
Naugatuck	37,971	47,982	42,977	53,000
Oxford	17,833	23,140	20,487	16,000
Prospect	7,934	11,269	9,603	15,000
Southbury	24,948	31,984	28,466	14,000
Thomaston	7,683	11,516	9,600	11,000
Waterbury	111,508	155,159	133,334	121,000
Watertown	25,873	37,514	31,694	33,000
Wolcott	13,874	21,582	17,728	26,000
Woodbury	17,566	20,825	19,196	21,000

Source: Central Naugatuck Valley Regional Planning Agency

(Data sheets used to develop municipal holding capacities are in the CNVRPA office for those interested in the detailed statistics used to develop holding capacities.)

11. PROGRAMS TO ACHIEVE REGIONAL LAND USE OBJECTIVES

Implementation of the Region's land use objectives which are listed on pages 69 through 73 and in the Regional Development Guide will require a more intimate and continuous relationship between the CNVRPA and the municipal, state and federal agencies currently making land use decisions. Since the majority of all land use decisions are made at the local level - through chief elected officials, planning and zoning commissions, conservation commissions, inland-wetlands commissions, economic development commissions and health districts - the majority of all regional land use programs will inevitably be geared toward improving the data and standards used in local decision making.

Land development powers in the public sector consist of taxation, zoning and other police powers, eminent domain, public works and fiscal assistance. These mechanisms of controlling land use are generally controlled at the local level with state and federal governments directly or indirectly influencing land development through the power of eminent domain and state and federal funding programs, projects and regulations. However, the CNVRPA, as a substate agency, possesses none of these regulatory or implementation powers and consequently its role is limited to providing information and policy suggestions, reviewing federal grants and local zoning proposals and encouraging intermunicipal coordination whenever feasible.

Although the Agency has limited power to make land use decisions, there are a variety of programs which can facilitate the achievement of regional land use objectives. The following land use or land use related programs are included as short-term planning projects to be completed prior to 1982. The twelve programs have been prioritized into primary and secondary projects reflecting the specific development objectives of the CNVR.

A. Overview of Land Use Program

<u>Description of Programs</u>	<u>Priority Ranking</u>	<u>Anticipated Completion of Annual Objective</u>
1. Airport Development	primary	1979
2. Industrial Park Development	primary	1979
3. Preservation of Agricultural Land	primary	1979
4. Water Quality	primary	1979
5. Local Technical Assistance	primary	1979
6. Development of a Consistent Data Base	primary	1979
7. Monitoring of Trends	primary	1979
8. Inventorying of Land Uses	secondary	1980
9. Historic Preservation	secondary	1980
10. Protection and Development of Sand and Gravel Resources	secondary	1980
11. Growth Management	secondary	1980
12. Regional Transit District	secondary	1980

These land use programs are geared to the Agency's five-year planning period and provide a method of directing the Region's growth in harmony with the goals, objectives and policies identified for the short-term planning period ending in 1990. The twelve land use programs include evaluation criteria which the CNVRPA would use to measure its biannual progress in achieving these programs. These evaluation criteria are in effect equivalent to the short-term policies to be used to guide land use development over the next five years.

PROGRAMS

1. Airport Development

The economic development of the Region is in large part dependent upon its transportation system and the ability of this system in meeting the needs of new industries. Future airport development will consider the expansion of airport facilities to accomodate larger planes, air freight service, the construction of a control

tower, the development of the area surrounding the airport for an industrial park and an evaluation of the environmental impact of proposed airport improvements.

One of the CNVRPA's special projects during 1978 will be the regional transportation plan which will include an evaluation of the improvements needed at the Waterbury-Oxford Airport.

Evaluation criteria for measuring program progress:

- a. Clearance of sight line obstruction between the southern portion of Runway 18-36 and the eastern portion of Runway 18-31.
- b. Extension of the length of Runway 18-36 so as to accommodate corporate jets using the airport during adverse weather conditions.
- c. Installation of runway end lights and leading lights on both runways after completion of runway extensions on Runway 18-36.

2. Industrial Park Development

The CNVRPA in cooperation with the Greater Waterbury Chamber of Commerce has prepared two studies on the advantages of locating electronic component and surgical and medical instruments and supplies firms in the Central Naugatuck Valley Region. An industrial park development program will require an inventory of land available for industrial and commercial use, a plan for its phased development and an evaluation of environmental impacts. The purpose of the program will be to ensure that new economic growth is channeled in such a way that it is effectively integrated with the transportation system, existing and proposed utility service areas and takes advantage of the resources of the labor force and the established resources of the urban core. The program will need to consider the development of possible state or local tax incentives to attract business and methods of renovating old factories for use by new industries. Finally, this Region's industrial park development program will be integrated with the Agency's annual update of its Overall Economic Development Program and its forthcoming work under 208 Water Quality Planning. One element of the 208 Water Quality Planning process includes a special study concerning industrial site selection. The protection of existing

ground water resources and the prevention of surface water pollution will be essential components of the Agency's industrial park development program.

Evaluation criteria for measuring program progress:

- a. Adoption of revised Industrial Zoning Regulations based on water quality standards.
- b. Attraction of new industries to the established high priority industrial development areas in the urbanized core of the Region.
- c. Attraction of industries designated as high priority based on the findings of the product studies prepared for the Waterbury Office of Economic Development.

3. Preservation of Agricultural Land

The rapid decline in agricultural land in the Region will require immediate actions if the CNVR is to maintain its self sufficiency in food and preserve its open space and woodland areas.

The CNVRPA will require a more detailed inventory of existing farmland along with maps of the Region's land protected under Public Act 490. A survey of the Region's farmers will be needed to determine: (1) how many are in danger of going out of business, (2) how they could be financially assisted by state or local governments, and (3) their support for current proposals to purchase the development rights of the state's farmland. The CNVRPA program for preservation of agricultural land could include the development of legislative proposals for possible changes in zoning ordinances and state or local tax proposals to reduce the cost of owning farmland.

The Agency's efforts will also include coordination of its planning activities with those of the King's Mark Resource Conservation and Development (KMRC&D) Project, since King's Mark plans for the preservation of agriculture in 47 municipalities in Northwestern Connecticut including the CNVR. The CNVRPA efforts could be strengthened by cooperating with those other municipalities.

Evaluation criteria for measuring program progress:

- a. Maintenance of the current level of land devoted to agricultural activities over the next three years based on mapping prepared by the Central Naugatuck Valley Regional Planning Agency.
- b. Adoption of model ordinances protecting or providing incentives for the maintenance of farmlands.
- c. Adoption of State legislation designed to purchase the development rights of farmers.

4. Water Quality

During 1977 the CNVRPA began analyzing the water resources and water pollution problems within the Region. Under 208 Water Quality planning, the CNVRPA is involved in a variety of studies including ground water protection, erosion and sedimentation, industrial site selection and land use and management. These studies will allow the Agency to refine its standards and criteria for land use development based on the expected impacts on ground and surface water quality.

Evaluation criteria for measuring program progress:

- a. Annual improvement in stream water quality at designated DEP water quality monitoring stations located in the Region.
- b. Adoption of municipal Zoning Regulations which are consistent with public watershed protection.
- c. Adoption by municipalities of revised Industrial Zoning Regulations establishing permitted industrial uses based on potential water quality hazards to aquifers, streams and impoundments.

5. Local Technical Assistance

The CNVRPA can also facilitate the achievement of land use objectives by providing local planning and zoning commissions and other local agencies with the most up to date and most accurate information on land use standards, criteria, laws and trends.

Technical assistance includes a wide variety of activities but should include review of local zoning and subdivision regulations, the development of model ordinances and the presentation of technical workshops on critical land use issues for citizens, planners and officials in the Region. In particular, the technical workshops should serve as a means to increase the awareness of local officials to the variety of regulatory procedures for protecting environmentally sensitive lands, and developing local land use policies which are in harmony with regional land use policies. Furthermore, technical assistance includes offering planning assistance to municipalities when municipalities are without the services of full-time professional planning staff.

Evaluation criteria for measuring program progress:

- a. Improved level of participation in the referral process.
- b. Expanded staff involvement and technical assistance at local planning and zoning meetings.
- c. Conduct seminars and workshops on such critical land use issues as preservation of farmland through the transfer of development rights, restriction of residential development surrounding Waterbury-Oxford Airport through the purchase of property or the transfer of development rights and inclusionary zoning. Training of commissioners in the latest planning tools and in the responsibilities of their post should also be considered.
- d. Conduct bi-monthly meetings with planners in the Region to improve communication and maximize the use of professional resources.

6. Development of Consistent Data Base

Often times, two different municipalities facing a similar land use issue may come to two different decisions simply because they have used inconsistent standards, criteria or data. Examples of data and standards which have had a bearing on land use decisions are as follows: population and employment projections, farmland tax assessment reduction standards, zoning standards for housing, parking, industry, commerce, etc. and industrial land prices, to name a few.

Coordination of the plans for land use development proposed by local, state and Tri-State agencies will be facilitated by the adoption and cross acceptance of consistent numerical targets for, at least, housing, population and employment. Numerical targets should also be adopted for the Region's land uses including the number of acres to be set aside for farmland, earth resources, industrial and residential development and permanent recreation areas. The CNVRPA has established numerical standards for population and for the amount of recreation land required over the next fifteen years. Similar standards must be developed for other land uses as well.

The Agency is currently working with the U.S. Census Bureau on the development of a geographic base file which will provide the CNVRPA and other planning and regulatory bodies with much more detailed demographic information by block and by census tract at the time of the 1980 census. The maps being prepared for the geographic base file will establish more accurate information and a consistent data base for use by all planning bodies.

Evaluation criteria for measuring program progress:

- a. Preparation of municipal maps for land use, utilities, soils, flood prone areas and zoning, prepared at a consistent scale for all thirteen municipalities.
- b. Revision of town map resources annually to insure the reliability of data base in the local planning process.
- c. Formal use of conservation and utility overlay maps within the local planning and zoning process.

7. Monitoring of Trends

Most land use decisions are facilitated by the availability of reliable, accurate and long-term data trends which can be used to indicate possible future needs and/or possible expansions or curtailment of services.

As part of a land use monitoring program aimed at assisting local planning and zoning boards, industry seeking to locate in the Region and the public, the RPA should maintain an ongoing monitoring program.

Evaluation criteria for measuring program progress:

Detailed statistics on long-term trends must be maintained or developed in the following areas:

- a. Industrial Growth: The size and number of new manufacturing firms locating in the Region;
- b. Industrial Land: The cost and availability of industrial land and industrial parks;
- c. Energy Growth: The per capita demand for electric energy in each town;
- d. Population Growth: The number of births and deaths in each town;
- e. Residential Growth: The number of building permits issued in each town;
- f. Housing Costs: The cost of housing in Waterbury and the suburbs;
- g. Residential Land: The cost and availability of residential land;
- h. Municipal Tax Rates: The mill rate and the cost of taxes per \$1,000 of market value in each town.

8. Inventorying Land Uses

Essential to all local and regional decision making is a regional land use map. Though there is a map for the Regional Plan of Development, there is no inventory or map of existing land uses on a regional level. An inventory of existing land uses is a prerequisite for all local or regional land use decisions since it would allow for a comparison between existing uses and proposed uses and facilitate the identification of land use conflicts between the local and regional plans of development.

Evaluation criteria for measuring program progress:

- a. Preparation and dissemination of maps depicting existing land use for each municipality.

b. Formal use of land use and land resource maps in the local planning and zoning activities of each municipality.

9. Historic Preservation

In order to ensure the protection of the Region's historic resources a comprehensive survey must be completed of potentially eligible structures and sites. Properties that are included in the National Register list or the Connecticut Historical Commission can become eligible for grants in aid programs to maintain and preserve historic properties. The CNVRPA will also be concerned with encouraging municipalities in the urbanized portion of the Region to complete surveys of their historic sites and structures and develop plans for historic districting. This may be a significant way of protecting the character of downtown Waterbury and minimizing unnecessary demolition of old structures. Preservation of Waterbury's historic sites is the responsibility of the Waterbury Urban Renewal Agency which is currently involved in the renovation and preservation of many structures in downtown Waterbury.

Evaluation criteria for measuring program progress:

- a. Identification and formal acceptance of the most significant historic sites and structures in the Region for preservation under the Connecticut Trust for Historic Preservation.
- b. Annual identification and placement of historic markers on at least 10% of all the Region's historic structures.
- c. Adoption of a comprehensive historic preservation program by the City of Waterbury, to be integrated with current downtown development plans.
- d. Annual restoration of at least 3 historic structures in the Region based on high priority preservation projects adopted by each municipality.

10. Protection and Development of Sand and Gravel Resources

There has been a rapid decline in the availability of sand and gravel sites in the State as well as the Region. These sites have often fallen prey to sprawl residen-

tial developments or have been covered over by parking lots, roads and other man-made facilities. The importance of sand and gravel in the construction of roads and buildings requires an immediate and nearby supply. An inventory of existing and potential sites must be prepared and mapped, local zoning ordinances must be amended to protect these non-renewable resources and an environmental assessment must be made to determine the impact of developing these resources on the community, the land and the quality of surface water. The impact of surface mining on water quality will be one facet of the General Studies on Ground Water Protection and Erosion and Sedimentation to be completed under the 200 Water Quality Planning process.

Evaluation criteria for measuring program progress:

- a. Adoption of model earth resource ordinances by all municipalities.
- b. Acceptance and formal use of earth resource maps in the planning and zoning process in each municipality.
- c. Adoption of state guidelines for the operation and extraction of sand and gravel resources under the enabling legislation provided to the Department of Environmental Protection.

11. Growth Management

One of the most critical problems facing suburban municipalities is how to control the location, timing and intensity of development. The purpose of this program will be to assist each planning and zoning commission in the Region to (1) develop land use controls which are based on minimum standards consistent with health and safety, (2) to integrate future plans for sewers and package treatment plants with their revisions to the plan of development and zoning maps, and (3) to develop flexible planning and zoning tools for controlling the location, timing and intensity of residential growth. A strong emphasis of this program will be the development of a regional growth management plan which could serve as a means for guiding the Region's growth through the disbursement of federal funds allocated for sewers, economic development and housing. The program will also attempt to provide technical

assistance to municipalities which have experienced rapid growth without effective tools for managing its location, intensity and timing.

Evaluation criteria for measuring program progress:

a. Adoption of zoning in the municipality of Bethlehem.

b. Adoption of flexible planning and zoning tools for providing lower cost housing, including cluster regulations, planned unit development concepts, special development districts and transfers of residential densities.

c. Revision of municipal zoning regulations and zoning maps in order to be compatible with the potential densities and housing opportunities offered by sewer services.

12. Regional Transit District

Public transportation has often been hampered by the lack of control over the operation and regulation of bus, taxi and specialized transportation services. The

State Statutes allow local governments or a coalition of governments to set their own operating and regulatory policies for local transportation under the authority of a transit district. A regional transit district could be operated, for example, by the Council of Governments and provide greater control over the operation of

transportation in the Region. Though this organizational mechanism is not expected to be implemented before 1979, it could ultimately have a strong influence on the

level of bus service offered within the Region.

The CNVRPA is currently engaged in, or preparing to undertake six separate special transportation projects. Ongoing projects include the development of regional transportation plans to identify the need for improvements in the Region's highway, air and rail facilities in order to expand service, increase safety and stimulate economic growth. Furthermore, possible forthcoming special projects include initiation of a regional transportation service for the handicapped, the initiation of a maintenance garage study to determine where a new facility should be built for Waterbury's local bus service, a monitoring program for local bus service and

implementation of the recommendations developed in the CNVRPA's recently completed

study on coordination of specialized transportation services. Though these transportation projects are to be under the supervision of the CNVRPA, a regional transit district could be the eventual sponsor of such projects as the transportation service for the handicapped, and the projects to be initiated through implementation of the recommendations of the coordination study.

The development of a regional focus to the planning, regulation, and operation of transit systems could eventually promote the development of a viable regional transit system that could lessen the need for automobile ownership.

Evaluation criteria for measuring program progress:

- a. To establish by 1980 a Regional Transit District supported by the Council of Governments.
- b. Adoption of revised regulation by the Regional Transit District for the operation of buses, taxis, liveries and other para-transit services.

Unsuitable land = one household/10 acres

Standard:

Conditionally suitable = one household/2 to 2.5 acres

Standard:

Suitable land = one household/acre

Standard:

Waste Water

Require certification of available capacity for the collection

Standard:

and treatment of sewage as a prerequisite for subdivision approval

or building permits.

Standard:

To discourage new development which will require sewers now or in

the future at a density of less than 2 dwelling units per acre.

Standard:

To design and operate collection and treatment systems on the

basis of natural watersheds or combination of watersheds.

Standard:

To discourage the extension of municipal and community sewer

systems into flood plains and public supply watersheds.

12. SUMMARY OF STANDARDS AND CRITERIA FOR DETERMINING FUTURE LAND DEVELOPMENT PATTERNS

The revised Regional Plan of Development includes 12 different functional elements that have identified policies, criteria and standards for effectively guiding the pattern of future land development. A complete discussion of all the land use policies developed by the Agency can be found in the following elements: Waste Water, Water Supply, Recreation and Open Space, Air Quality, Economic Development, Transportation, Housing, Farms, Farmers and Farmlands, Energy, Flood Control and Prevention, Land Use and Health and Education.

The standards and criteria presented below have been abstracted from these land use related elements in order to provide a summary listing of the major land use standards and criteria of the Agency's Revised Regional Plan and other subsequent reports. These standards and criteria have been grouped under the element of the plan in which they were developed.

Land Use

- Standard: Unsuitable land = one household/16 acres
- Standard: Conditionally suitable = one household/2 to 2.5 acres
- Standard: Suitable land = one household/acre

Waste Water

- Standard: Require certification of available capacity for the collection and treatment of sewage as a prerequisite for subdivision approval or building permits.
- Standard: To discourage new development which will require sewers now or in the future at a density of less than 2 dwelling units per acre.
- Standard: To design and operate collection and treatment systems on the basis of natural watersheds or combination of watersheds.
- Standard: To discourage the extension of municipal and community sewer systems into flood plains and public supply watersheds.

Flood Control and Prevention

Standard: To limit new development in flood prone areas where the benefit of development to the community is not commensurate with the cost of flood protection to the community.

Recreation and Open Space

Standard: Ridge tops, escarpments, significant wetlands existing recreational trails and other unique natural features should be preserved as open space.

Standard: Priority should be given to the development of recreational sites within and close to the major population concentrations in the Region.

Standard: There should be 53 acres of open space land for every 1,000 residents of the Region.

Farms, Farmers and Farmlands

Standard: To encourage the preservation of all agricultural activities and agricultural lands to assure Connecticut residents of low cost food supplies.

Standard: To maintain current levels of agricultural self-sufficiency in the production of eggs, milk, fruits and vegetables.

Standard: To promote residential development on non-agricultural lands (when septic systems are feasible or sewer services are present) to limit the decline of productive farmland.

Health and Education

Standard: New health facility locations must be planned in relation to population, densities, the transportation network and the availability of suitable sites.

Standard: Consider the unification of school districts in order to reduce the number of necessary school sites and improve the quality and fiscal support for education.

Energy

Standard: To encourage industrial and residential development to be in close proximity to existing or proposed electrical generating plants in order to take advantage of the waste heat produced by the generating plant.

Air Quality

Standard: To discourage the location of industries in areas where additional industrial emissions may violate current air quality standards.

Standard: To limit the development of buildings or facilities which will generate sufficient automotive traffic to become indirect sources of carbon monoxide or hydrocarbons.

Transportation

Standard: To discourage major highway construction into remote low density and open space areas of the Region.

Standard: To provide local bus service to areas with transit supporting densities.

Standard: Minimum transit supporting density for bus service = 7 dwelling

Economic Development

Standard: To discourage the proliferation of strip commercial uses along major transportation routes.

Standard: To encourage the clustering of economic activities in the urban core, the secondary centers and in existing and proposed utility

Water Supply

Standard: Potential aquifer sites along the Pomperaug, Nonnewaug and Housatonic Rivers and Honeypot and Branch brooks should be protected.

Standard: To protect all identified potential ground and surface water sites, recharge areas and watersheds that will be needed in the future.

Housing

Standard: To discourage residential development on wetlands, floodplains and other areas which for environmental reasons are unsuitable for housing.

Standard: To prevent the encroachment of residential development on designated open space and recreational areas.

Standard: To encourage high density development close to centers of urban services.

Standard: To encourage the channeling and clustering of residential development in close proximity to essential urban services and at sufficient densities to permit the adequate and economic provision of these services.

Standard I.4.1: Residential urban high density = 8 dwelling units or more

per net acre* at the core.

Standard I.4.2: Residential urban medium density = 4-7.9 dwelling units per

net acre at the core and radiating from the secondary centers.

Standard I.4.3: Residential urban low density = 2-3.9 dwelling units per net

acre at the periphery of the core and secondary centers.

OBJECTIVE II: To limit residential, trades and services and industrial develop-

ment in the areas of the Region proposed to remain unwatershed in

order to minimize the possibility of adverse environmental impact.

POLICY II.1: To restrict development in the areas designated as limited develop-

ment on the Plan of Regional Development to large lot, single-

family housing, but permitting some clustering where land conditions

are particularly conducive to on-site septic systems.

*Net acres equal gross acres minus areas utilized for non-residential purposes (streets, rights-of-way, parks, commercial, etc.).

13. OBJECTIVES, POLICIES AND STANDARDS

- GOAL: To ensure the orderly growth of the Region through coordinated and integrated plans and programs based on the Region's environmental constraints and its social and economic opportunities.
- OBJECTIVE I: To direct urban development to areas within the Region's historical urban core and emerging secondary clusters.
- Policy I.1: To encourage the location of a wide range of economic activities, public services and high residential densities in the Region's urban core.
- Policy I.2: To encourage a subsidiary level of economic activities, services and residential development in the secondary centers of the Region.
- Policy I.3: To encourage the provision of sewer services in areas proposed for urban residential, trades and services and industrial development.
- Policy I.4: To promote the gradation of urban residential densities radiating outward from the central core and secondary centers.
- Standard I.4.1: Residential urban high density = 8 dwelling units or more per net acre* at the core.
- Standard I.4.2: Residential urban medium density = 4-7.9 dwelling units per net acre at the core and radiating from the secondary centers.
- Standard I.4.3: Residential urban low density = 2-3.9 dwelling units per net acre at the periphery of the core and secondary centers.
- OBJECTIVE II: To limit residential, trades and services and industrial development in the areas of the Region proposed to remain unsewered in order to minimize the possibility of adverse environmental impact.
- Policy II.1: To restrict development in the areas designated as limited development on the Plan of Regional Development to large lot, single-family housing, but permitting some clustering where land conditions are particularly conducive to on-site septic systems.

*Net acres equal gross acres minus acres utilized for non-residential purposes (streets, rights-of-way, parks, commercial, etc.).

Standard II.1.1: Residential limited development = less than 0.5 dwelling units per net acre.

Standard II.1.2: Residential limited development (clustered) = 0.5 to 0.9 dwelling units per net acre. Although clustering could be permitted, an equal amount of land would be set aside for open space. Thus, overall densities for the limited development clustered category would be equivalent to the limited development non-clustered category.

Policy II.2: To discourage large scale industrial, commercial and industrial development in limited development areas.

Policy II.3: To discourage the expansion of sewer service areas in limited development areas.

Policy II.4: To encourage the preservation of agricultural land through reduced tax assessments and the transfer of development rights to the State.

OBJECTIVE III: To protect and preserve open space areas for residential and environmental purposes.

Policy III.1: To preserve natural areas with steep slopes, shallow bedrock, floodplains, wetlands and other areas unsuitable for development as predominately open space areas.

Standard III.1.1: Natural areas = approximately 1 dwelling unit per 16 gross acres.

Policy III.2: To provide many open space areas for the development of recreational uses for the residents of the Region.

LAND SUITABILITY ANALYSIS

Classification of the Region's land as to its suitability for development is a necessary prerequisite to relating the Region's development policies to specific land use proposals.

Rather than merely describing the conditions of the Region by general statistics, a system of incorporating soil surveys and interpretive maps has been devised. This is now possible because detailed soil maps for the Region were recently completed by the USDA Soil Conservation Service (SCS). These maps reflect soil features and associated land conditions (such as shallow to bedrock, slope, flooding, wetness, etc.) that directly influence land use and land development.

Soil groupings of soils that have similar properties were made to simplify the use of soil survey data for a land use planning guide. The SCS has conducted studies and made observations of the various soils which relate to their limitation and suitability for septic tank absorption fields, streets, homes with basements and a multitude of other uses. This model of land suitability analysis, therefore, groups soils with similar degrees of limitations for specific land uses or developments. The model provides a method of determining where municipal sewers would be needed if the density of development exceeds that which can be supported using on-site sewage disposal.

Land Suitability Categories

The National Cooperative Soil Survey in Connecticut classifies the different kinds of soils (known as soil mapping units) shown on the detailed soils maps into Natural Soil Groups based on common natural physical properties. The CNVRPA suitability analysis model then further reduces these Natural Soil Groups into the three suitability categories described below.

(1) Suitable Land Condition

This category consists of land that can be readily developed at moderate densities,

using on-site sewerage and water systems, or at much higher densities, using municipal systems. Most of the soils are well-drained, deep and permeable. They are formed in glacial till or outwash and exist on slopes of less than 15%. Excluded are well drained soils of the floodplains, soils occurring in shallow to bedrock areas, or soils that are well drained but having impermeable (fragipan) layers. The mapping technique used delineated this category on the Land Condition Map as clear areas.

Natural Soil Groups included in the suitable land condition category are shown on Table 4-1. In Litchfield County*, 28 percent of the entire land area consists of soil types that are included in the category of Suitable Land Condition. Area measurements of soil types have not been calculated for the nine towns in the Region which are within New Haven County. Because of the topographical similarity between the nine New Haven County towns in the Region and the Litchfield County towns, it is assumed (despite lack of data for New Haven County) that a similar relationship between suitable land and the other two categories would exist in the Region as a whole.

It is suggested that in a cluster development, the maximum net residential density could be one household per acre in areas having suitable land conditions and not serviced by either municipal sewage or water facilities.** The residential density may be increased to two households per acre if municipal water service is available, and the area will be serviced by sewers within a period of ten years. Where sewer and water service is available the maximum residential density is limited only by local and regional planning policy.

*Four of the CNVR municipalities are in Litchfield County.

**In cluster developments, the lot size may be reduced by 25% if the remaining land is preserved as open space, thus keeping the overall density of the development constant.

(2) Conditionally Suitable Land Condition

This category consists of land that can be developed only at low densities using on-site sewage and water systems. However, it can be developed at much higher densities when municipal sewerage and water systems are available. Most of the soils are moderately well-drained or well-drained soils having an impermeable layer. Excluded are the moderately well-drained soils of the floodplains.

Conditionally suitable land was delineated on the Land Condition Map as shaded areas.

In Litchfield County, 24% of the land area falls into this category. It is assumed that this same relationship of conditionally suitable land to the other two categories in Litchfield County also exists in this Region.

It is recommended that the maximum net residential density be 1 household per 2 or 2-1/2 acres in areas where neither sewerage or water systems are available. If municipal water service is available and the area will be sewered within a five year period, the maximum density could be increased to 1 household per 1-1/2 acres. Where sewer and water service and adequate storm drainage systems are available, the maximum residential density is limited only by local and regional planning.

policy.

(3) Unsuitable Land Condition

This category encompasses the areas where the physical condition of the land makes it very difficult or uneconomical to support developments. The severity of the adverse land conditions may vary. Very severe conditions for development exist in swamps, marshes and in waterbodies, very poorly drained soils, floodplains and on extremely steep slopes and rockland. In these areas, virtually no development has occurred nor is it anticipated that any appreciable amount of development will occur in the future. In other unsuitable areas where land conditions are rated as severe rather than very severe some limited amount of development is anticipated.

The unsuitable land condition category is composed of four primary land forms, which include a number of diverse soil types.

TABLE 2-6: Natural Soil Groups by Suitability for Development

CNVRPA Suitability of Land for Development	S.C.S. Natural Soil Groups						
	A. Terrace Soils- over sand and gravels	B. Upland Soils- over friable to firm glacial till	C. Upland Soils- over compact glacial till	D. Upland Soils- rocky and shal- low to bedrock	E. Floodplain Soils	F. Marsh and Swamp Soils	G. Lake Terrace Soils- over strata high in silt and clay
Suitable Land	A-1a	B-1a					
	A-1b	B-1b					
	A-1d	B-1c					
	A-1e						
Conditionally Suitable Land	A-2	B-2a	C-1a				G-1
		B-2b	C-1b				G-2
			C-1c				
			C-2a				
Unsuitable Land			C-2b				
	A-1c	B-1d	C-1d	D-1	E-1	F-1	G-3a
	A-3a	B-1e	C-1e	D-2	E-2	F-2	G-3b
	A-3b	B-3a	C-3a		E-3a		
		B-3b	C-3b		E-3b		

Source: S.C.S. Natural Soil Groups arranged by CNVRPA staff. For explanation of Natural Soil Groups see S.C.S. Know Your Land. A listing of the Soil Mapping Units in the Region which fall into each Natural Soil Group is available at the CNVRPA.

(a) Floodplain Land contains two groups of soils.

- (i) The first group contains moderately well-drained, poorly drained, and very poorly drained alluvial soils. Also, included in this group are excessively drained soils located on the banks of large water courses which are frequently flooded. This group of soils is easily identified by its high water table and high frequency of flooding. Very little residential development has previously occurred on this group of soils.
- (ii) The second group contains well-drained alluvial soils. These soils are also very susceptible to flooding but less frequently than the previous group. Because they generally occur in the higher elevations of the floodplain and are not as easily identifiable, some limited development has previously occurred on this group of soils.

(b) Wetlands contain only one group of soils.

- (i) The wetlands soil group contains poorly and very poorly drained glacial till, outwash and aeolian soil not found in the floodplains but rather in the uplands and on terraces. These soils all have a high water table and generally will not pass a percolation test. Sections 22a-3b to 22a-43 of the Connecticut General Statutes (concerning inland wetland water courses) and the State Health Codes (concerning on-site sewage disposal) discourage further development of significant wetlands.

(c) Steep land contains 3 groups of soils all occurring on slopes of 15% or more.

- (i) Steep, deep soils include all steep upland glacial till soils and terrace escarpment soils formed from glacial fluvial (outwash) deposits. This land is free from bedrock. Some development has occurred in the past on this group of soils and will continue to occur in the future. It is generally scattered single-family homes on large lots.
- (ii) Steep, rocky and very rocky soils are steep, shallow to bedrock soils containing pockets of deeper soils where some amount of development has occurred in the past and will continue to occur in the future.

- (iii) Steep, extremely rocky soils and rockland are mostly shallow with bedrock outcropping over a significant portion of the land surface. Very little development of these soils has occurred nor will it occur in the future.
- (d) Bedrock Land includes four groups of soils, two of which also occur on steep land.
 - (i) Rocky and very rocky soils occurring on gentle slopes contain frequent pockets of deep soils. Development of these soils has occurred at varying densities depending on external urbanization pressures. Municipal sanitary services can be installed at considerable expense. Deep test pits dug to investigate the possibility of on-site sewage systems will normally rule out large tract residential developments on these soils, although the scattered pockets of deep soil may permit a few individual homes to be constructed on these sites.
 - (ii) Extremely rocky soils on gentle slopes contain few pockets of deep soils. Some scattered single-family development is possible but the installation of sewage systems is not normally feasible except in high density urban areas.
 - (iii) Steep, rocky and very rocky soils (previously described).
 - (iv) Steep, extremely rocky soils and rockland (previously described).

Based on the Litchfield County distribution, about 48 percent of the Region probably has Unsuitable Land Condition. The Land Use Plan places most of this area into the Open Space and Natural Area classification as its use for residential purposes is not desirable. But scattered houses already exist on the unsuitable land, and some will be built in the future. For the purposes of calculating the ultimate holding capacity of the Region under this Plan, some estimate of the holding capacity of the Unsuitable Land is, therefore, required.

Table 4-2 shows how the estimate of holding capacity was made. The percentage contribution of each soil group to the total amount of unsuitable land in Litchfield

TABLE 2-7: Calculation of Holding Capacity for Unsuitable Land in Litchfield County (Assuming the Use of Septic Tanks)

Soil Group	Unsuitable Land in Litchfield County	Soil Group as % of Unsuitable Land	Estimated Holding Capacity of Soil Group	Contribution of Soil Group to Overall Holding Capacity
Floodplain Land:				
(i) Moderately well, poorly & very poorly drained soils in floodplains; excessively drained soils frequently flooded.	13,571 (acres)	4.6 (%)	.01 (dwelling unit per acre)	.00046
(ii) Well drained soils in floodplains, infrequently flooded.	2,595	0.9	.10	.00009
Wetlands:				
(i) Poorly & very poorly drained glacial till, fluvial and aeolian soils.	59,742	20.4	.01	.00204
Steep Land (slopes over 15%)				
(i) Steep, deep soils.	70,485	24.1	.10	.02410
(ii) Steep, very rocky soils	23,573	8.1	.02	.00162
(iii) Steep, extremely rocky soils & rockland	56,782	19.4	.01	.00194
Bedrock Land:				
(i) Rocky & very rocky soils (slopes less than 15%)	38,811	13.3	.20	.02660
(ii) Extremely rocky soils (slopes less than 15%)	26,918	9.2	.05	.00460
(iii) Steep, rocky and very rocky soils (previously described).				
Total Unsuitable Land	292,477	100.0		.062 (dwelling units/acre)

FORMULA:

$$\sum \left(\frac{\text{Soil Group Acreage}}{\text{Unsuitable Land Acreage}} \times \frac{\text{estimated holding capacity of Soil Group}}{\text{overall holding capacity of Unsuitable Land}} \right) =$$

Sources: S.C.S. Soil Survey, Litchfield County, Connecticut, 1970.

CNVRPA Staff estimates and calculations.

County was calculated. This percentage was then multiplied by the holding capacity of that particular soil group to obtain its contribution to the overall holding capacity for unsuitable land of 0.062 dwelling units per acre or one dwelling unit per 16 acres. Again, the assumption is that the soils are distributed in the Region in a manner similar to that of Litchfield County.

While development is discouraged in these areas, houses on existing roads may be permitted if the owner proves that an adequate pocket of good soil is available for permanent septic tank leaching field operation. In such instances, minimum lot size should be 2-1/2 acres per household.

(1) Residential Classes

All residential density classes defined as urban require sewer and water services to be brought to the lot.

The urban high (8.0 or more dwellings per acre) and urban medium (4.0 to 7.9 dwellings per acre) are largely built up areas. The classification recognizes the prevailing density in the respective areas. Pockets of vacant land and replacement housing should be developed at these higher densities to maintain population accessible to the central core and secondary centers. Most, if not all, housing will be in multiple unit structures.

Urban low (2.0 to 3.9 dwellings per acre) describes the most common density of recently built and proposed serviced developments. Densities below this are too low to be efficiently provided with public sewers and water, mass transportation, and community services within walking distance. Yet, a sizeable proportion of families with young children express a preference for housing with sufficient land for outdoor activities and privacy. To best meet all these goals for better living the whole community, the Land Use Plan proposes that the majority of new housing be at the urban low density located in and around existing built-up areas. Both single family and town house apartments can be used to provide this density of housing. Occasional mid-rise apartment buildings could meet the needs of some kinds of households.

LAND USE CATEGORIES

In order to use the land suitability analysis and apply the concepts of Regional Form described above, the land area of the Region is assigned one of several possible land use categories. These are similar to zones on a municipal zoning map but at a regional scale must be more generalized. Existing land use and the present and future extent of sewer and water service areas are additional important considerations in deciding the best use of a particular area.

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Where sewers have already been extended to contiguous areas with a density less than 2 dwellings per acre, in-fill development should occur at greater densities to bring the overall density into the urban low category. Where development will precede the provision of sewers (a practice discouraged by the Regional Plan), clustering of units should be required, to allow for in-filling after the sewers are provided (if it is desired). The intention is that no sewer area should have a long-term density of less than 2 dwellings per acre.

The Regional Plan specifically allows for variety in life styles; hence, it is recognized that some families will choose to live on large lots in rural surroundings, dependent on on-lot sewage disposal and water and on the automobile to reach all goods and services. This must be a deliberate choice, recognizing the hidden cost to the householder and without the burden or consequences falling on the community as a whole. Transportation and urban sprawl difficulties can be avoided only if this is a minor housing pattern; health dangers and expensive sewer extensions can be avoided if the land is suitable for this use and the lots large enough. Limited development density (less than 0.5 dwellings per acre) is, therefore, proposed for all land outside existing and proposed sewer service areas which does not have severe or very severe limitations for development. The principle existing uses of this land - agriculture and private holdings of undeveloped property - will continue, but individual houses and large lot subdivisions will be developed as agricultural land and undeveloped woodlots are sold.

The undeveloped watersheds of existing and future water supply reservoirs are included in this category.

For some land, the soil and slope conditions are such that on-site water supply and sewage disposal can be safely and permanently performed on a lot of one acre. In these "suitable for development" areas, Limited Development (Clustered) is indicated, so that small subdivisions at the higher density of one dwelling per acre may be constructed; but, overall, the average density would be kept to, at most, half that.

(2) Open Space Classes

The suitability analysis identified those areas of the Region which by soil and slope criteria have severe and very severe limitations for urban development. These unsuitable areas have been placed in the Natural Area category and it can be anticipated that because of low density zoning, inland wetlands regulations, floodplain controls and the enforcement of health codes governing on-site sewage disposal systems, most of this land will remain in open space uses. Some housing already exists in these areas, and small inclusions of better soil may permit additional scattered development in the future, but it is likely that the ultimate overall density will not exceed one house for every sixteen acres.

Natural areas are not simply left-over land. They are valuable in many respects. Some of the Region's most scenic roads twist through the ridges, forests and swamps or along the rivers that make up this land category. Furthermore, natural areas provide recharge areas for ground water aquifers, feeding municipal water supplies and protecting water supplies and rivers from receiving excessive levels of storm runoff or sedimentation associated with areas undergoing development.

Permanent Open Space and Recreation reservations have in the past and will continue in the future to include all kinds of land in a variety of locations. The areas are chosen for their scenic, environmental or recreational value on the basis of significant natural features, land availability and access to the population they serve. The importance of these latter two criteria can be seen in that while the more rugged large parks would have been classified as unsuitable for urban development anyway, other areas are potentially very suitable land with sewers nearby. However, their location close to built-up areas marks them as desirable urban parks and recreation areas. It is essential that all such open space land be reserved by public or permanent semi-public ownership.

(3) Trades and Services

The scale of the Regional Land Use Plan does not permit the representation of all commercial land uses that exist or are proposed within the Region. The central core

of Waterbury and the secondary centers of Cheshire, Southbury and Naugatuck are

obvious areas of shopping known to most residents of the Region. However, smaller groupings of shops occur in the centers of the other municipalities as well.

The neighborhood centers are not shown, nor have future community shopping centers been indicated. It is the intention of the Plan with respect to the former that convenient services be provided in association with all new sizable developments, with pedestrian access wherever possible. New shopping centers should be located on major roads where demonstrated need indicates that those enterprises will not compete with shopping centers in the core and secondary centers.

(4) Industrial

Again, because of scale, only significant groupings of industry can be shown on the Regional Land Use Plan and no distinction is made between light and heavy industries. The major locational factors are accessibility to the labor force, ease of movement for goods and materials, and physically suitable serviced land.

(5) Institutional

Institutional uses include government services, religious, education, municipal and other public buildings and associated land. Many of these "point" uses are too small to be indicated, but major land holdings such as the Southbury Training School are indicated. Cemeteries are included in this category.

PROCEDURE FOR CALCULATING THE HOLDING CAPACITY OF THE PLAN OF REGIONAL DEVELOPMENT

The computation of the total holding capacity consists of calculating the holding capacity of each land use category represented on the Plan. Although most residential development will occur in areas designated as residential, some will occur in areas designated for non-residential purposes. The assumption is made that Trade and Service areas in some of the municipalities' Central Business Districts and Natural Areas will contain a certain amount of residential development.

The Plan capacity for each land use class is derived from the following data:

1. Quality of Developable Land (Gross Acres). This consists of land which is suitable or conditionally suitable for development. In each land use class, a percentage of land is unsuitable for development. However, even land unsuitable for development can be developed to a limited extent. Thus, a holding capacity has been developed for residential land unsuitable for development (see Number 10 of Detailed Steps in Appendix D).

(2) Institutional

2. Percentage of land which will actually be used for residential purposes.

Item 1 represents gross area of developable land. Not all of this land, however, will be used for residential development. A portion will be used for streets, parklets, rights-of-way, and other non-residential uses. Thus, a discount factor is incorporated to convert gross area of developable land to net area.

3. Density (Dwelling Units/Net Acre). Each residential land use class has a specified net density range. For other land use classes, net densities have been hypothesized.
4. Household Size (Persons/Dwelling Unit). Multiplying the first three items together produces the number of dwelling units in a particular land use category. A hypothesized household size of 2.9 at time of capacity converts "dwelling units" into "population."

Mathematically, then, for each land use class:

$$\text{Plan Capacity} = \frac{\text{Developable Area (Gross)}}{\text{Percent of Land to be Used for Residential}} \times \frac{\text{Net Residential Density}}{\text{Household Size}} + \text{Capacity of Land Unsuitable for Development}$$

Where:

$$\text{Capacity of Land Unsuitable for Development} = \frac{\text{Gross Area of Undevelopable Land}}{\text{Gross Residential Density (1 DU/16 acres)}} \times \text{Household Size}$$

See Appendix D for the detailed steps in calculating holding capacity.

APPENDIX D

DETAILED STEPS IN CALCULATING HOLDING CAPACITY

1. Total Area: The area of each land use class was measured by a leaf area measuring device and a dot grid and adjusted in order that the total area of all land use classes for a given municipality equals the area stated in the 1970 Land Use Update Study of Connecticut prepared by the State Department of Finance and Control.
2. Land Unsuitable for Development: The Land Conditions Map and Revised Regional Plan Map were compared and the percent of land unsuitable for development within each land use class was estimated. The acres were calculated by multiplying this percent by the total area. Since Land Unsuitable for Development can be developed to a limited extent because of pockets of buildable land, a holding capacity for this land has been computed (see Step 10).
3. Land Suitable/Conditionally Suitable for Development (Gross Acres): Calculated by subtracting Land Unsuitable for Development from Total Area.
4. Discount Factor: Discount factors were originally used in the CNVRPA publication Zoning Regulations: 1962, based on New York Regional Plan Association computations. The Discount Factor is given as a percent and then multiplied by the Land Suitable/Conditionally Suitable for Development to give the Discount Factor in Acres.
5. Land Suitable/Conditionally Suitable for Development (Net Acres): Calculated by subtracting the Discount Factor Acres from the Land Suitable/Conditionally Suitable for Development Acres (Gross Acres) to obtain net acres for residential development.
6. Net Residential Density (Dwelling Units/Acre): The net residential densities assigned to the Plan's various land use classes are given below. Since density ranges are used in the residential land use categories, low, average, and high holding capacities have been computed.

a. Residential

1. Urban High Density (8 Dwelling Units/Acre or More). In Naugatuck the maximum density permitted under zoning (17.4 Dwelling Units/Acre) was used. For Waterbury, the land use policies of the 1971 Waterbury

Comprehensive Plan were incorporated in deriving a density -- 11% of

the Urban High area was assumed to be developed at 54 Dwelling Units/Acre and 89% was assumed to be developed at 18 Dwelling Units/Acre.

The percentages represent the ratio of Residential Moderate Density to Residential High Density in Waterbury's Comprehensive Plan.

2. Urban Medium Density (4 to 7.9 Dwelling Units/Acre)
3. Urban Low Density (2 to 3.9 Dwelling Units/Acre)

4. Limited Development Clustered and Non-Clustered (0.5 Dwelling Units/Acre

or less). For the Limited Development Clustered category, clustering

would be encouraged on 1 acre lots with an equivalent area being reserved

as open space. Consequently, the overall density is 0.5 Dwelling Units/Acre.

Since the two Limited Development classes have comparable densities, they have been combined in the calculation of holding capacity.

b. Trades and Services

In six of the Region's municipalities, residential uses exist or are

permitted under zoning in commercial areas. In calculating holding capacity,

residential uses were assumed in portions of the Central Business Districts

of Cheshire, Naugatuck, Southbury, Thomaston, Waterbury and Watertown.

Residential densities were assigned either to reflect: (1) local zoning or

else (2) the characteristics of each municipality's Central Business District

(if those permitted under zoning were regarded as being too low). The

specific densities are as follows:

Cheshire: 12 DU/Acre

Naugatuck: 54 DU/Acre (this would be equivalent to Waterbury's Residential High Density)

Southbury: 12 DU/Acre (present zoning only permits 2 DU/Acre in the R-20 zone)

Thomaston: 12 DU/Acre (present zoning only permits 6.2 DU/Acre in the R-15 zone)

Waterbury: 100 Bedrooms/Acre (this density is proposed in the 1971 Waterbury Comprehensive Plan; 1.5 persons/bedroom is assumed)

Watertown: 24 DU/Acre

c. Institutional. Some institutions are residential in nature. However, most persons residing in institutions do not constitute a portion of the household population. Thus, institutional land did not enter into the calculation of holding capacity.

d. Industrial. No residential uses.

e. Natural Areas. Because most natural areas consist of 90% unsuitable land conditions for development, they are considered to be a form of open space. No controls other than large lot zoning or other environmental land use controls are proposed for these areas, thus some development is expected to occur. The areas suitable for development contained in the Natural Areas, as identified from the Land Conditions Map, would be developed at a net density of 0.5 DU/Acre.

f. Open Space. Includes Permanent Open Space, Proposed Open Space, Water Bodies, and Flood Control areas. No residential or other "build-up" development is proposed.

7. Dwelling Units. Calculated by multiplying Land Suitable/Conditionally Suitable for Development (Net Acres) with Residential Density.

8. Household Size. A household size of 2.9 persons per household is assumed at time of capacity.

9. Holding Capacity of Suitable/Conditionally Suitable Land. Calculated by multiplying Dwelling Units.

10. Holding Capacity of Residential Land Unsuitable for Development. In calculating the Land Suitable/Conditionally Suitable for Development (Gross Acres), an acreage figure for Land Unsuitable for Development was obtained. As explained in the Land Use Element, a certain amount of the unsuitable land is in fact suitable for development. This suitable land, scattered throughout the larger unsuitable areas, has been estimated to be 1/16th of the larger area. Thus a holding capacity for Land Unsuitable for Development was computed, assuming a gross residential density of 1 DU/16 acres and a zero discount factor: gross acres x 2.9 persons/household.

11. Total Holding Capacity. The holding capacities computed in steps 9 and 10 were added together to obtain total household population holding capacity.

In 1974 there were 10.5 manufacturing employees per acre in the suburbs and 760 manufacturing employees per acre in Waterbury. Overall in June 1974, the Region had 50.4 manufacturing employees per acre in its 1,746 acres of industrial land. The trend toward large suburban sites for manufacturing firms clearly indicates that even with a reduction of workers in the manufacturing sector of the labor force, there will certainly be a continued demand for additional land for industry as manufacturing employment growth shifts to the suburbs.

APPENDIX E

Detailed Procedure for Computing Industrial Land Requirements in 1990

				Percent Employed CNVR Residents Working Within CNVR (80% based on 1970 U.S. Census)	Percent of Persons Working in CNVR who Live in the CNVR = 88% based on U.S. Census) = 111,707
Total Workers in CNVR in 1990	= 1990 Projected Population (274,000)	x 1990 Labor Force Participation Rate (assumed to be 45%)	x		
				Number of Employees Per Acre (assumed to be 15 employees/ acre)	= 2,532 acres
1990 Industrial Land Required	= Total Workers in CNVR in 1990	x Percent of Region's Workers in Manufacturing in 1990 (assumed to be 34%)	x		
Additional Industrial Land Needed (1970-90)	= 1990 Industrial - Land Required	1970 Existing Industrial Land (1,746 acres)			= 786 acres

In 1974 there were 10.5 manufacturing employees per acre in the suburbs and 760 manufacturing employees per acre in Waterbury. Overall in June 1974, the Region had 50.4 manufacturing employees per acre in its 1,746 acres of industrial land. The trend toward large suburban sites for manufacturing firms clearly indicates that even with a reduction of workers in the manufacturing sector of the labor force, there will certainly be a continued demand for additional land for industry as manufacturing employment growth shifts to the suburbs.

APPENDIX F

Detailed Steps for Calculating the Demand for Utility Land in 1990

Utility Rights of Way Anticipated by 1990		Circuit Length Miles	Add'l Right of Way (feet)	Destination Within Region	Size of Transmission Line.	Acres Needed to clear
<u>From</u>	<u>To</u>					
Frost Bridge S/S Watertown	Prospect Jct. Thomaston	4.2 ¹	150' ³	Prospect Jct.	115KV	76.4
Frost Bridge S/S	Beacon Falls Town Line	7.0	40'	Beacon Falls Town Line	345KV	33.9
Shepaug S/S Southbury	Bates Rock S/S Southbury	5.4	50'	Bates Rock S/S	115KV	20 ²
Total Acreage Required						130.3

SOURCE: ¹ The Northeast Utilities System: Ten and twenty year forecasts of loads and resources, January 1, 1976,
p. 123.

² The Connecticut Light & Power Co., Report submitted with Application for a 115KV Transmission Line in Southbury between Shepaug Sub Station and Bates Rock Substation, December, 1975, p. 32.

³ Interview with Clyde Fischer, Northeast Utilities, August 6, 1976.

(Notes)	Shepaug	Expectation in 1990	Clearcut (1990)	1990	In 1990
Expectation	Anticipated	Minimum	Land and	Land in	Minimum Expectation
Minimum	Anticipated	Clearcut and	Land for	and Clearcut	Land & Clearcut and
Devoted to	on construction	for land and	Anticipated land	Anticipated land	be anticipated as
1990 Land	of land based	Land Anticipated	Anticipated to	Anticipated to	Anticipated to
	Anticipated		Anticipated	Anticipated	Anticipated

and Minimum Expectation Land Use in 1990
Detailed steps for calculating the use of land and clearcut

APPENDIX G

Detailed Steps for Calculating the Loss of Sand and Gravel and Mineral Extraction Land Uses by 1990

1970 Land Devoted to Mineral Extraction (Acres)	Annual Loss of Land Based on Construction Aggregate Availability Study	Land Available for Sand and Gravel and Mineral Extraction in 1990	Ratio of Inactive to Active Land Used for Sand and Gravel (1990)	Expected Amount of Inactive Sand and Gravel Land in 1990	Total Land Anticipated to be Classified as Sand & Gravel and Mineral Extraction in 1990
1,320	5.4%	433.8	$\frac{540}{780} = 69\%$	212.5	646.3

Source: Soils and Foundations Division, Connecticut Highway Department, Construction Aggregate Availability Study: Summary Report: Highway District IV, and Connecticut Department of Finance and Control, Office of State Planning, 1970 Land Use Tabulations, June 1972.

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1970 Land Devoted to Mineral Extraction (Acres)	Annual Loss of Land Based on Construction Aggregate Availability Study	Land Available for Sand and Gravel and Mineral Extraction in 1990	Ratio of Inactive to Active Land Used for Sand and Gravel (1990)	Expected Amount of Inactive Sand and Gravel Land in 1990	Total Land Anticipated to be Classified as Sand & Gravel and Mineral Extraction in 1990
1,320	5.4%	433.8	$\frac{540}{780} = 69\%$	212.5	646.3

Detailed Steps for Calculating the Demand for Mineral Land in 1990

APPENDIX E

Appendix H: Detailed Steps for Calculating the Demand for Residential Land During the Period 1970 to 1990

Residential Density Ranges	Percent Total D/U in Each Density Range 1970 ¹	Total D/U in Each Density Range in 1970 ²	Estimated Distribution by Density Range of New Construction Built Between 1970 - 1990 ³	Total D/U to be Constructed by Density Range 1970-1990 ⁴	Discount D/U Constructed Between 1970-1975 ⁵	Actual D/U to be Constructed Between 1975-1990	Average Density Per Category (DU/Acre) ⁶	Net Acres Required for Residential Dev. 1970-1990	Add'l Acres Required for Right-of-Way (5% of Gross Acres) ⁷	Gross Acres Required for Residential Dev. 1970-1990
Waterbury										
Under 1/2 DU Acre	0.0	0	0.0	0	0	0	0.5	0.0	0.0	0.0
1/2 to 1 DU Acre	0.1	36	0.1	5	4	1	0.75	4.0	0.2	4.2
1 to 2 DU Acre	25.1	9,191	25.1	1,380	1,100	280	1.5	921.0	48.4	969.4
2 to 8 DU Acre	74.3	27,207	74.3	4,087	3,260	827	4.0	1,021.0	53.6	1,074.6
8 and more DU Acre	0.5	184	0.5	28	23	5	12.0	2.3	0.1	2.4
TOTAL	100.0	36,618	100.0	5,500	4,388	1,112	-	1,948.3	102.3	2,050.6
Remainder of Region										
Under 1/2 DU Acre	3.0	1,059	5.0	1,025	356	669	0.3	3,416.0	180.0	3,596.0
1/2 to 1 DU Acre	23.3	8,221	29.0	5,945	2,068	3,977	0.75	4,458.0	235.0	4,693.0
1 to 2 DU Acre	45.5	16,053	30.0	6,150	2,138	4,012	1.5	4,100.0	216.0	4,316.0
2 to 8 DU Acre	26.0	9,173	32.0	6,560	2,281	4,279	4.0	1,640.0	86.0	1,726.0
8 and more DU Acre	2.2	776	4.0	820	285	535	12.0	68.0	3.6	71.6
TOTAL	100.0	35,282	100.0	20,500	7,128	13,372	-	13,682.0	720.6	14,401.6
Region	-	71,900	-	26,000	11,516	14,484	-	15,630.3	822.9	16,452.2

- Sources:
1. U.S. Bureau of the Census, 1970 Second Count Summary Tape Tabulation 29 and 38.
 2. 1970 Connecticut Land Use update study.
 3. Based on CNVRPA Staff work. It is expected that future residential development in Waterbury will result in an allocation of dwelling units in the same proportion that existed in 1970. In the 12 remaining municipalities of the Region, it is projected that higher costs of housing will increase the proportion of new residential construction in the 2 to 8 DU/Acre and the 8 and over DU/Acre categories with a decline in the areas zoned for 1 to 2 DU/Acre due to the environmental problems of failing septic systems on small lots. Finally, although dwellings built on 2 acre lots or larger are expected to increase in costs, they are assumed to be part of the predominant American Housing Choice and will, therefore, increase in proportion to houses built on the 1 acre lot.
 4. Housing Element, CNVRPA, June 1977.
 5. Profile of the CNVR 1970 - 1975, CNVRPA, April 1977.
 6. Based on CNVRPA Staff work, May 1977.
 7. The Cost of Sprawl, Real Estate Research Corp., April 1974, p.93.

Appendix I
Shared Growth Formula for Determining Municipalities Most Suitable and Capable
of Accommodating Short-Term Residential Development: 1978 - 1990

Municipality	Acres Proposed ¹ to be Sewered under Regional Plan			Population ² Growth 1975-1990			Percent of ³ Holding Capacity Available by 1990 (Ranked)			Least Tax ⁴ Burden of Public Education 1975			Total ⁵ Non-Agricultural Employment 1975			
	Total Percent	Weighted Percent (30%)	Total Percent	Total Percent	Weighted Percent (10%)	Total Percent	Total Percent	Weighted Percent (30%)	Total Percent	Total Percent	Weighted Percent (20%)	Total Percent	Total Percent	Weighted Percent (10%)	Total Weight	
Beacon Falls	1,350	3.49	1.047	300	0.98	0.094	4	11.1	3.33	58.8	7.78	1.55	1,330	1.6	0.16	6.150
Bethlehem	134	0.35	0.105	400	1.31	0.131	4	11.1	3.33	66.5	8.92	1.78	110	0.1	0.01	5.356
Cheshire	4,598	11.88	3.564	8,600	26.76	2.876	1	2.7	0.81	43.4	5.81	1.17	6,120	7.4	0.74	9.160
Middlebury	2,471	6.38	1.914	900	2.94	0.294	4	11.1	3.33	125.0	18.90	3.78	4,580	5.5	0.55	10.438
Naugatuck	4,595	11.87	3.561	2,600	8.50	0.850	3	8.3	2.49	52.6	6.80	1.36	9,420	11.4	1.14	9.401
Oxford	2,010	5.19	1.557	1,300	4.25	0.425	4	11.1	3.33	76.9	10.10	2.02	460	0.5	0.05	7.370
Prospect	1,264	3.26	0.978	2,200	7.19	0.719	1	2.7	0.81	58.8	7.78	1.55	1,020	1.2	0.12	4.172
Southbury	2,670	6.90	2.070	3,100	10.13	1.013	3	8.3	2.49	125.0	18.90	3.78	3,070	3.7	0.37	9.723
Thomaston	1,470	3.80	1.140	700	2.29	0.229	3	8.3	2.49	62.5	8.27	1.65	3,240	3.9	0.39	5.719
Waterbury	9,620	24.85	7.455	-1,600	-5.23	-0.523	2	5.5	1.65	40.0	9.03	1.80	45,450	55.0	5.50	15.878
Watertown	4,377	11.31	3.393	4,300	14.05	1.405	2	5.5	1.65	45.4	5.90	1.18	4,720	5.7	0.57	8.241
Wolcott	2,919	7.54	2.262	4,200	13.73	1.373	1	2.7	0.81	33.3	4.41	0.88	1,700	2.0	0.20	5.426
Woodbury	1,236	3.19	0.957	3,400	11.11	1.111	4	11.1	3.33	66.6	8.92	1.78	1,340	1.6	0.16	6.938
CNVR	38,714	100.0	30.0	30,600	100.0	10.0	36	100.0	30.0	754.9	100.0	20.0	82,570	100.0	10.0	100.0

Source: See footnotes

Footnotes to Shared Growth Formula
for Short-Term Residential Development

¹Acres proposed to be sewered under Regional Plan, Source: Land use holding capacity summary table for the Central Naugatuck Valley Region - 1974 (available for review at the CNVRPA).

²Population Growth, 1975-1990: Source: CNVRPA Housing Element, July 1977 and the Connecticut State Department of Health "Estimated Populations in Connecticut as of July 1, 1975."

³Percent of holding capacity available by 1990: Source: CNVRPA Staff work 1977. Municipalities were grouped according to what percent of their remaining holding capacity would still be available by 1990. These groupings represent critical thresholds signifying that water runoff, septic system failures and open space deficits may be increased. The holding capacity rating system is presented below:

Holding Capacity Rating System for Municipalities
in the CNVR: Based on CNVRPA 1990 Population Projections

	Points
Less than 15% of holding capacity available by 1990	1
From 15% to less than 30% of holding capacity available by 1990	2
From 30% to less than 45% of holding capacity available by 1990	3
45% or more of holding capacity available by 1990	4

⁴Least tax burden of public education 1975: Source: CNVRPA Education Element, July 1975 and the Educational Resources Development Center, University of Connecticut.

⁵Existing Industrial Land 1970: Source: CNVRPA Staff work 1975.

Appendix J

Shared Growth Formula for Determining Municipality Most Suitable
and Capable of Accomodating Short-Term Industrial Development: 1978 - 1990

Municipality	Employment ¹			Expected ²			Financial ³		
	Growth 1975-1990	Total Percent	Weighted Percent (20%)	Not to Commute 1975	Total Percent	Weighted Percent (20%)	Burden of Public Education 1975	Total Percent	Weighted Percent (20%)
Beacon Falls	1,547	7.55	1.510	1,320	2.51	0.502	1.7	7.46	1.490
Bethlehem	236	1.15	0.230	649	1.23	0.246	1.5	6.58	1.310
Cheshire	1,822	8.89	1.770	6,317	12.00	2.400	2.3	10.09	2.010
Middlebury	772	3.76	0.750	1,990	3.78	0.756	0.8	3.51	0.702
Naugatuck	801	3.91	0.780	6,119	11.68	2.330	1.9	8.33	1.660
Oxford	1,192	5.81	1.160	1,933	3.67	0.734	1.3	5.70	1.140
Prospect	1,810	8.83	1.760	2,623	4.98	0.996	1.7	7.46	1.490
Southbury	1,021	4.98	0.996	2,750	5.22	1.040	0.8	3.51	0.702
Thomaston	717	3.50	0.700	1,218	2.31	0.462	1.6	7.02	1.400
Waterbury	5,293	25.80	5.160	15,009	28.51	5.700	2.5	10.96	2.190
Watertown	2,641	12.89	2.570	5,764	10.95	2.190	2.2	9.65	1.930
Wolcott	1,787	8.72	1.740	5,125	9.74	1.940	3.0	13.16	2.630
Woodbury	844	4.12	0.820	1,820	3.46	0.692	1.5	6.58	1.310
Total	20,483	100.0	20.0	52,637	100.0	20.0	22.8	100.0	20.0

Source: See footnotes

Appendix J (continued)

Shared Growth Formula for Determining Municipalities Most Suitable and Capable of Accommodating Short-Term Industrial Development: 1978 - 1990

Indicators of Opportunities

Municipality	Hours of ⁴ Daily Public Bus Service			Vacant ⁵ Buildable Land Zoned for Industrial Development			Availability ⁶ of Utilities in Industrial Zone: 1975			
	1975	Total Percent	Weighted Percent (10%)	1975	Total Percent	Weighted Percent (10%)	1975	Total Percent	Weighted Percent (20%)	Total Weight
Beacon Falls	4.26	1.53	0.153	323	4.86	0.486	21.25	8.54	1.708	5.849
Bethlehem	0.00	0.90	0.000	0*	0.00	0.000	0.00	0.00	0.000	1.786
Cheshire	33.75	12.14	1.210	1,710	25.73	2.570	27.50	11.06	2.212	12.172
Middlebury	2.00	0.72	0.720	524	7.89	0.789	22.50	9.05	1.810	5.527
Naugatuck	7.70	2.41	0.241	278	4.13	0.413	45.00	18.09	3.618	9.047
Oxford	0.00	0.00	0.000	1,453	21.87	2.180	0.00	0.00	0.000	5.214
Prospect	0.00	0.00	0.000	264	3.97	0.397	0.00	0.00	0.000	4.643
Southbury	4.00	1.44	0.144	265	3.99	0.399	0.00	0.00	0.000	3.281
Thomaston	0.80	0.29	0.029	71	1.07	0.107	40.00	16.08	3.216	5.914
Waterbury	183.26	65.94	6.590	594	8.94	0.894	45.00	18.09	3.618	24.152
Watertown	12.42	4.47	0.447	529	7.96	0.796	27.50	11.06	2.212	10.145
Wolcott	30.74	11.06	1.106	534	8.04	0.804	20.00	8.04	1.608	9.828
Woodbury	0.00	0.00	0.000	100	1.50	0.150	0.00	0.00	0.000	2.972
CNR	279.93	100.0	10.0	6,645	100.0	10.0	248.75	100.0	20.0	

*There is no zoning in Bethlehem.

Source: See footnotes 1

Footnotes to the Shared Growth Formula for
Short-Term Industrial Development

- ¹Employment Growth 1975-1990: Source: The Travel Demand Forecasting section of the Connecticut Department of Transportation 1975
- ²Expected Not to Commute, 1975: This indicator represents the labor force in each municipality which commutes to other municipalities for employment. Source: The Connecticut Labor Department 1975 and the Connecticut Department of Transportation 1970 Census Journey-to-Work, October 1975.
- ³Financial Burden of Public Education: This indicator is an effort index which is based on the following formula:
$$\frac{\text{Local funds spent on education} \times \text{assessment rates} \times 100}{\text{Net Grand List}}$$
Source: CNVRPA Education Element 1975 and the Educational Resources Development Center, University of Connecticut.
- ⁴Hours of daily public bus service, 1975: Source: CE Maguire, Short-Range Transit Development Program and the CNVRPA Consumers' Guide to Transportation, 1976.
- ⁵Vacant buildable land zoned for industrial development, 1975: This indicator is based on planimeter measurements of land zoned for industrial development which was vacant and suitable for development in 1975. Maps depicting the vacant and buildable land in industrial zones in 1975 are available for review at the CNVRPA.
- ⁶Availability of utilities in industrial zone, 1975: This indicator is based on a CNVRPA inventory of utilities in industrial zones. The allocation of points to each industrial zone is based on the assumption that sewer service is a more significant variable than gas service. The utility rating system is presented on the next page.

Utility Rating System of Industrial Land in Municipalities of the CNVR

Level of Public Sewer Service

Points

1. 75 to 100% 20.0
2. 50 to 74.9% 15.0
3. 25 to 49.9% 10.0
4. Less than 25% 5.0
5. No sewers system 0.0

Level of Public Water Service

Points

1. 75 to 100% 15.0
2. 50 to 74.9% 10.0
3. 25 to 49.9% 5.0
4. Less than 25% 2.5
5. No central water supply 0.0

Level of Gas Service

Points

1. 75 to 100% 10.0
2. 50 to 74.9% 5.0
3. 25 to 49.9% 2.5
4. Less than 25% 1.25
5. No gas distribution system 0.0

Source: CNVRPA Staff work, August 1977

1. Summary of the Land Use Plan:

The Land Use Plan for the CNVR proposes to focus development in the urban core of the Region with a subsidiary level of development in the secondary centers. The Land Use Plan states that residential, commercial and industrial development be limited in the areas of the Region proposed to remain unsewered in order to minimize the possibility of adverse environmental impact. Residential growth is encouraged in the urban core with a gradation in residential densities radiating outward from the central core and secondary urban centers. The plan also has the objective of preserving agricultural lands through reduced tax assessments and the transfer of development rights to the State. Areas with limited development potential are to be maintained as natural areas or areas of open space with the possibility of developing some of these areas for residential uses.

2. The environmental impact of the proposed plan:

The proposed plan of development will have a positive impact on the preservation of agricultural land if it is carried out. Furthermore, energy will be conserved and air pollution will be reduced through the land use plan's objective of strengthening development in the urbanized core. However, there could be some adverse effects on water quality and flooding by concentrating development in the urban core. Increased areas of paved surface could lead to increased runoff, pollution and sedimentation which could reduce water quality and possibly increase local flood hazards on the Naugatuck River. However, the land use plan, if carried out, should reduce the possibility of ground water contamination created by landfilling solid waste. The plan proposes a regional resource recovery facility which will reduce landfilling in the Region and maximize resource recovery.

3. Any adverse environmental effects which cannot be avoided should the land use plan or policies be implemented.

There are no adverse environmental effects which can not be avoided should the land use element be implemented in its entirety.

4. Alternatives to the land use plan and policies.

There are three significant alternatives to the regional land use plan, each of which would have a different impact on the environment. These alternative land use plans can be categorized in the following way:

a. Older Cities - Under this alternative, the Region would develop only in its established historic urban core and would restrict all development in the outlying secondary centers. The current pattern of suburban development could be halted even though it is the predominant choice for residential and industrial development in the Region. While this option could revitalize the central city of Waterbury it does not consider the current trends of development nor the desires of those seeking to live in the suburbs.

b. Multiple Centers - The emphasis under this alternative land use option would be to establish patterns of concentrated urban development where they may arise even if this might be outside of the established urban core of the Region. The secondary centers in the Region would be further developed and industrial parks would become small urbanized areas supporting commercial and residential development in the immediate surrounding areas. The disadvantage of developing multiple urban centers in the Region would be that established utilities and commercial centers would not be effectively utilized leading to an inefficient development of the established urban core.

c. Transit Supporting Densities - One land use development plan which offers a serious alternative to the Regional Land Use Plan is to cluster development so as to reinforce and create corridors and centers capable of supporting mass transportation by public buses. This land use development option has the advantage of reducing air pollution and increasing the conservation of energy. However, the development of the Region along established highway corridors (or in new areas which would have sufficient population densities to support public buses) might lead to a spread city or linear city development pattern which would not efficiently utilize the existing services, and utilities in the established urban core.

5. Relationship between local short term uses of man's environment and the maintenance and enhancement of long-term productivity as set forth in the land use plan:

The land use plan proposes that the Region develop within the structure of its established regional form thereby maximizing development in the urban core and channelling the short-term use of the Region's land in those areas where sewer and water services are already available. This policy will limit sprawl development in the western and northern portions of the Region which are currently heavily oriented toward agriculture and have a large potential for long-term extraction of sand and gravel resources.

The Region's long-term productivity of agricultural products, the extraction of sand and gravel resources and the distribution of clean and drinkable water supplies from watershed areas will be possible if the Region's short-term policies for the development of land are carried out. The phasing of the Region's industrial, commercial and residential development emphasizes that the urban core should be strengthened thereby preserving limited development areas, areas of open space, natural areas, and watershed lands used for public water supplies. By preserving the Region's natural areas and open space areas the land use plan will be indirectly facilitating the maintenance of its farmlands and sand and gravel sites.

6. Any irreversible or irretrievable commitments of resources which would be involved if the land use plan is implemented:

The Regional Land Use Plan has emphasized a series of strategies which would minimize any irreversible commitment of financial resources for sewers, community facilities and additional transportation facilities. However, the commitment of fiscal resources in the Region's urbanized area will be necessary to maintain (and expand where necessary) the existing sewers, public water service, roads and community facilities. These will be irretrievable financial commitments necessary to support the viability of the established urban core.

7. Applicable Federal, State and local government controls relating to land use development in the Region:

The Region's land use development is controlled by a hierarchy of governmental

organizations responsible for the use and development of land. The following are some of the governmental controls applicable to land use development in the Region:

Municipal Level:

1. Planning and Zoning Regulations

2. Subdivision Regulations

3. Inland Wetlands Regulations

4. Various municipal ordinances, including sand and gravel ordinances

5. Local Plan of Development

6. Historic District Regulations

Regional Level:

1. Plan of Regional Development

2. Transportation Improvement Program and TDP Project Reviews

3. State Statutory Referrals on zoning and subdivision changes of intermunicipal concern (advisory)

State Level:

1. Air Quality Regulations - DEP

2. Noise Regulations - DEP

3. Water Quality Regulations - DEP, State Health Department and Public Utilities Control Authority.

4. Historic Districting Statute - Connecticut Historical Commission

5. Various state laws and regulations, including the State Building Code, the State Transportation Plan, housing policies of the Department of Community Affairs, OFM's Plan of Conservation and Development, etc.

Federal Level:

1. The A-95 Review Process

2. Regulations of U.S. Department of HUD.

3. Regulations of the U.S. Department of Transportation and the Federal Highway Administration.

4. U.S. Department of the Interior.

Historic Assessment

The CNVRPA publication, Historic Landmarks and Programs for Preservation identifies 200 historic sites in the Region, sets forth policies in the area of historic preservation and lists available preservation programs. The Land Use Element emphasizes that development should occur in the urban core with subsidiary levels of development in the secondary centers. This land use policy, when tied with the Housing Element's emphasis on housing rehabilitation and the Economic Development Element's emphasis on the conservation of materials and land, fully supports the policies of the historic preservation report. No adverse impact is expected on the 3 National Register properties located in the Region as a result of proposals contained in the Land Use Element.

